User’s Manual

Wireless 11n Router

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FCC Part 68

This equipment complies with Part 68 of the FCC Rules. On the bottom of this equipment is a label that contains the FCC Registration Number and Ringer Equivalence Number (REN) for this equipment. You must provide this information to the telephone company upon request.

The REN is useful to determine the quantity of devices you may connect to the telephone line and still have those entire devices ring when your number is called. In most, but not all areas, the sum of the REN of all devices connected to one line should not exceed five (5.0). To be certain of the number of devices you may connect to your line, as determined by the REN, you should contact your local telephone company to determine the maximum REN for your calling area.

If the modem causes harm to the telephone network, the telephone company may discontinue your service temporarily.
If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible.
You will be advised of your right to file a complaint with the FCC.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be notified in advance to give you an opportunity to maintain uninterrupted telephone service.

If you experience trouble with this modem, please contact your dealer for repair/warranty information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected or you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

FCC Part 15

The modem generates and uses radio frequency energy. If it is not installed and used properly in strict accordance with the user's manual, it may cause interference with radio and television reception. The modem has been tested and found to comply with the limits for Class B computing devices in accordance with the specifications in Subpart B, Part 15 of the FCC regulations. These specifications are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. FCC regulations require that shielded interface cables be used with your modem.

If interference does occur, we suggest the following measures be taken to rectify the problem:

1) Move the receiving antenna.

2) Move the modem away from the radio or TV.

3) Plug the modem into a different electrical outlet.

4) Discuss the problem with a qualified radio / TV technician.

CAUTION:

Changes or modifications not expressly approved by the party responsible for compliance to the FCC Rules could void the user's authority to operate this equipment.

Cable connections:

All equipment connected to this modem must use shielded cable as the interconnection means.

Notes:

Operation is subject to the following two conditions:

1) This device may not cause harmful interference, and

2) This device must accept any interference received including interference that may cause undesired operation.

Chapter 1 Introduction

Congratulations on your purchase of an Instant Wireless 11n Router with 4-port Fast Ethernet Switch and 802.11b/g, 802.11n for cable and DSL application. The Wireless 11n Router is the perfect option to connect a small group of PCs to a high-speed Broadband Internet connection or to an Ethernet backbone. Configurable as a DHCP server, the Broadband Router acts as the only externally recognized Internet device on your local area network (LAN). The Router serves as an Internet firewall, protecting your network from being accessed by outside users. The data rates up to 300Mbps for wireless connection, user can easy to share HD video or data transfer.

1.1 Overview

Unlike a simple hub or switch, the setup of the Cable/DSL Router consists of more than simply plugging everything together. Because the Router acts as a DHCP server, you will have to set some values within the Router, and also configure your networked PCs to accept the IP Addresses the Router chooses to assign them. And generally there are three different operating modes for your applications. And you can know which mode is necessary for your system from ISP. These three modes are PPPoE, DHCP client and Static IP. Actually all these are for IP address of WAN.

1.2 Features

- Router Mode
  - PPP over Ethernet (RFC-2516)
  - DHCP Server and Client
  - NAPT (Network Address and Port Translation)
  - NAT (Network Address Translation
- Internet Access
  - TCP/IP, UDP, ICMP, ARP, RARP, PPPoE, NAT, DHCP (client/server), Static IP assignment
- Security Features
  - Password protected configuration access
  - User authentication (PAP/CHAP) for PPP connection
- Wireless Features
  - Support 802.11b/g, 802.11n draft 2.0 Wireless Access Point
  - Support 128-Bit and 64-Bit WEP encryption , 802.1x, WPA, WPA2
  - Support wireless operation mode as AP, WDS and AP Client
- Security
  - Support packet inspection and filtering
  - Intrusion detection and protection
  - Password protected system management

- Ethernet Interface
  - Compliant with IEEE 802.3 and 802.3u 10/100 Mbps
- HTTP Web-Based Management
  - Firmware upgrade by UI
  - WAN and LAN side connection statistics
  - Advanced QoS
  - Password protected access
  - Wireless LAN
  - System log

1.3 System Requirements

1) Personal computer (PC)

2) Pentium II 233 MHz processor minimum

3) 32 MB RAM minimum

4) 20 MB of free disk space minimum

5) Ethernet Network Interface Controller (NIC) RJ45 Port

6) Internet Browser

Chapter 2 Installation

This chapter offers information about installing your router. If you are not familiar with the hardware or software parameters presented here, please consult your service provider for the values needed.

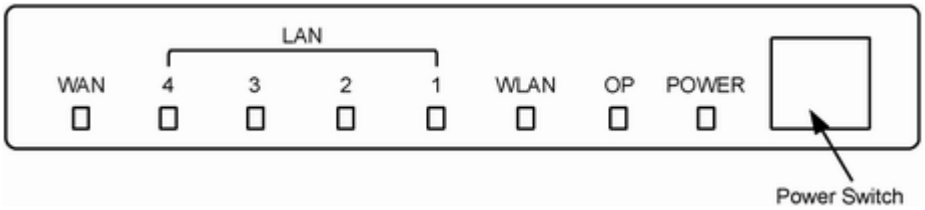
2.1 Checklist

Check the shipping box carefully to ensure that the contents include the items you ordered. If any of the items are missing or damaged, contact your local distributor. The contents of your carton may vary depending on your service provider.

Contents description

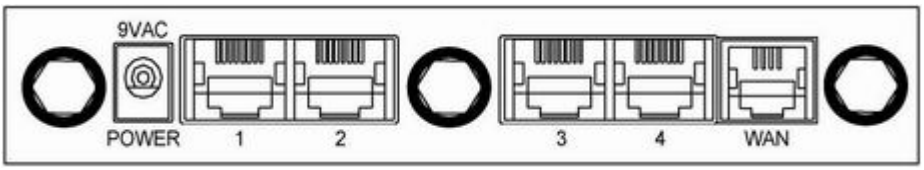
1) Wireless 11n Router for home/office use
2) Wireless 11n Router Installation and Operation Guide (this publication)
3) Power supply with 9VAC / 1Ampere power adapter
4) Ethernet cable Ethernet category 5 twisted pair cable (6 ft)

2.2 The Front LEDs



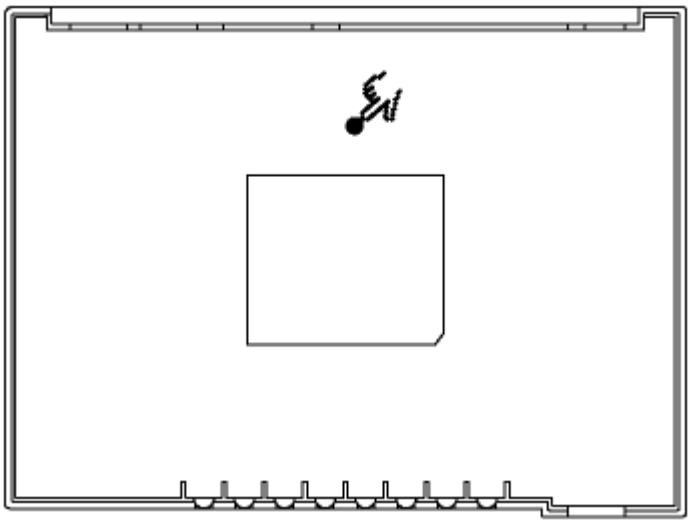
LED	State	Description
POWER	ON	Press the button to power one the router.
WAN	ON	"Showtime"-successful connection between ADSL modem and telephone company's network.
	Flashing	"Handshaking"-modem is trying to establish a connection to telco's network Modem is powered OFF ADSL Carrier Detect if LED is flash.
	OFF	No link.
OP	Flashing	The router running well.
WLAN	ON	When wireless AP is ready.
LAN 1-4	ON	Link
	Flashing	TX or RX activity
	OFF	No Link These four LAN (Local Area Network) ports are where you will connect networked devices, such as PCs, print servers remote hard drives, and anything else you want to put on your network.

2.3 The Rear Ports



Connector	Description
POWER	Power connector with 9VAC / 1Ampere.
LAN (1-4)	Router is successfully connected to a device through the corresponding port (1, 2, 3 or 4). If the LED is flashing, the Router is actively sending or receiving data over that port.
WAN	The WAN (Wide Area Network) Port is where you will connect your cable, DSL modem or Ethernet backbone.

2.4 The Bottom Port



Connector	Description
Reset Switch	The reset button, the router restore default settings when press until reboot.

Chapter 3 Configuration

3.1 Determine your connection settings

Before you configure the router; you need to know the connection information supplied by your service provider.

3.2 Connecting the Wireless 11n Router to your network

Unlike a simple hub or switch, the setup of the ADSL Router consists of more than simply plugging everything together.

Because the Router acts as a DHCP server, you will have to set some values within the Router, and also configure your networked PCs to accept the IP Addresses the Router chooses to assign them. Generally there are several different operating modes for your applications. And you can know which mode is necessary for your system from ISP. These modes are router, bridge, PPPoE+NAT.

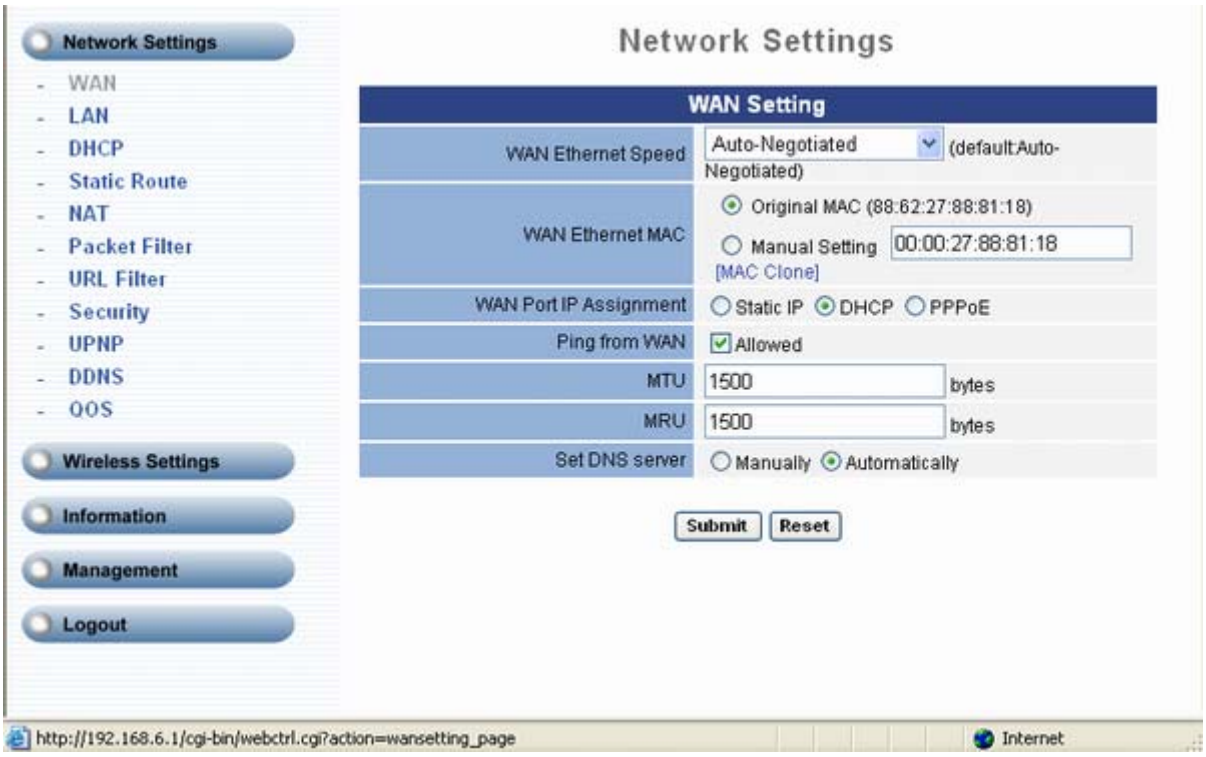
3.3 Configuring with Web Browser

It is advisable to change the administrator password to safeguard the security of your network.

To configure the router, open your browser, type '**http://192.168.6.1**' into the address bar and click 'Go' to get to the login page. Save this address in your Favorites for future reference.

At the Password prompt, the User name is '**admin**' and the password is '**admin**'. You can change these later if you wish. Click **'Login**' to login.

3.3.1 WAN Setting



WAN Settings are settings that are used to connect to your ISP (Internet Service Provider). The WAN settings are provided to you by your ISP and often times referred to as "public settings". Please select the appropriate option for your specific ISP.

For most users, Internet access is the primary application. The router supports the WAN interface for internet access and remote access. The following sections will explain more details of WAN Port Internet access and broadband access setup. When you click “WAN Setting”, the following setup page will be shown. Three methods are available for Internet Access.

Static IP

If you are a leased line user with a fixed IP address, enter in the IP address, subnet mask, gateway address, and DNS (domain name server) address(es) provided to you by your ISP. Each IP address entered in the fields must be in the appropriate IP form, which are four IP octets separated by a dot (x.x.x.x). The Router will not accept the IP address if it is not in this format.

Example: 168.95.1.2

IP Address: Check with your ISP provider.

Subnet Mask: Check with your ISP provider.

Default Gateway: Check with your ISP provider.

DHCP

Dynamic Host Configuration Protocol (DHCP), Dynamic IP (Get WAN IP Address automatically). If you are connected to the Internet through a Cable modem line, then a dynamic IP will be assigned.

Note: WAN port gets the IP Address, Subnet Mask and default gateway IP address automatically, if DHCP client is successful.

PPPoE

Point-to-Point Protocol over Ethernet (PPPoE). Some ISPs provide DSL-based services and use PPPoE to establish communication link with end-users. If you are connected to the Internet through a DSL line, check with your ISP to see if they use PPPoE. If they do, you need to make sure the following items,

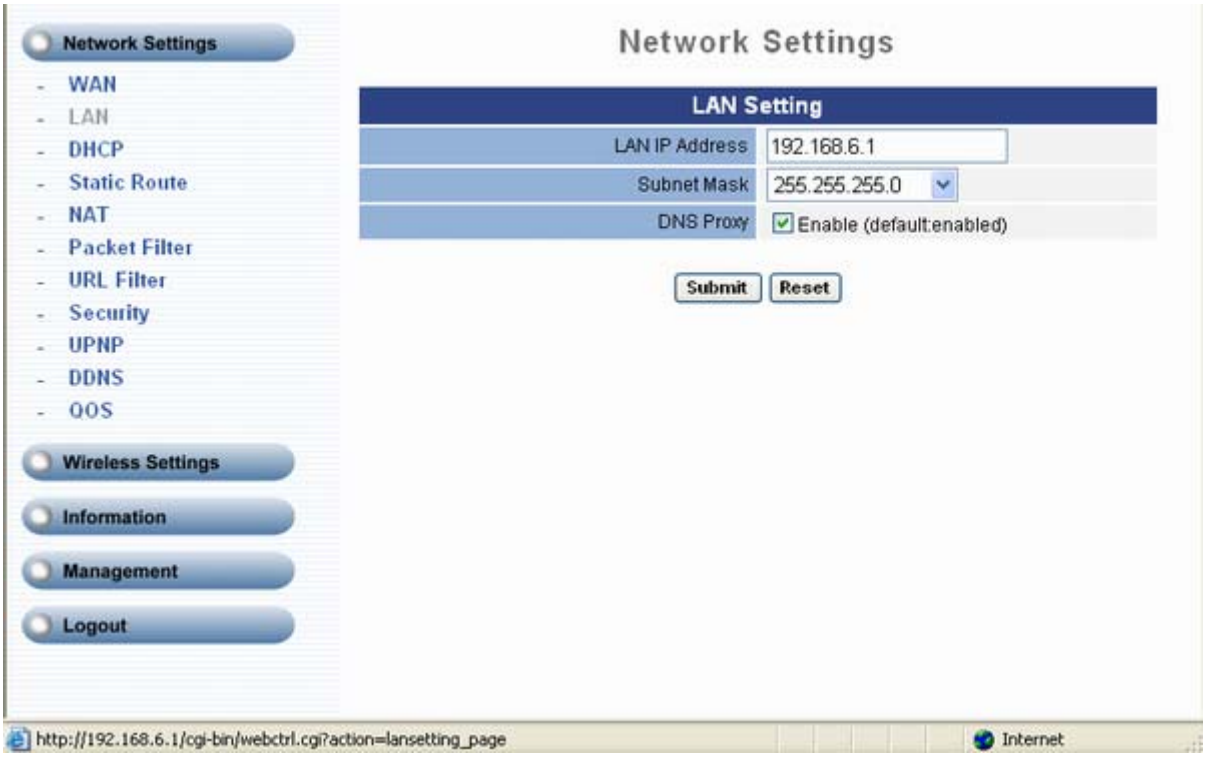
PPPoE User name: Enter username provided by your ISP.

PPPoE Password: Enter password provided by your ISP.

WAN Ethernet MAC

The MAC (Media Access Control) Address field is required by some Internet Service Providers (ISP). The default MAC address is set to the MAC address of the WAN interface in the device. It is only necessary to fill the field if required by your ISP.

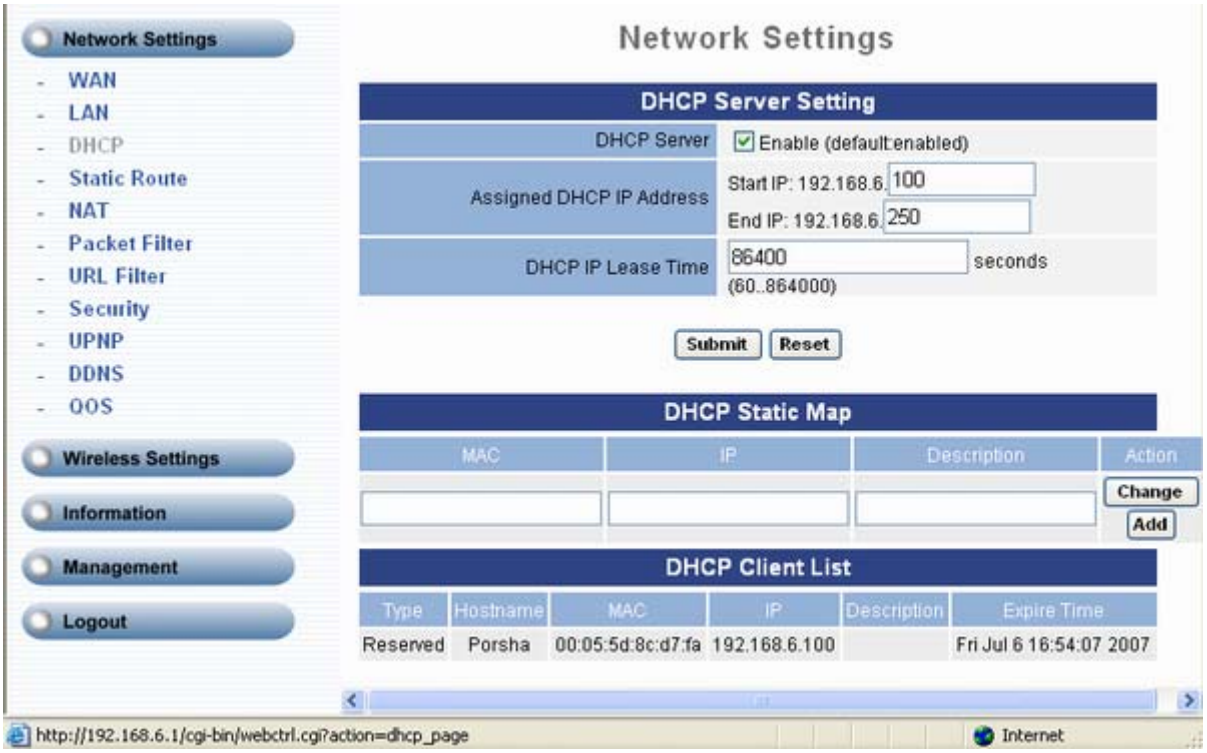
3.3.2 LAN Setting



These are the IP settings of the LAN (Local Area Network) interface for the device. These settings may be referred to as "private settings". You may change the LAN IP address if needed. The LAN IP address is private to your internal network and cannot be seen on the Internet. The default IP address is 192.168.6.1 with a subnet mask of 255.255.255.0

LAN is a network of computers or other devices that are in relatively close range of each other. For example, devices in a home or office building would be considered part of a local area network.
LAN IP Address: Assign the IP address of LAN server, default is 192.168.6.1
Subnet Mask: Select a subnet mask from the pull-down menu, default is 255.255.255.0

3.3.3 DHCP Setting



When you enable the DHCP server,

Assigned DHCP IP Address: Enter the starting IP address for the DHCP server's IP assignment and the ending IP address for the DHCP server's IP assignment.

DHCP IP Lease Time: Assign the length of time for the IP lease, default setting is 86400 seconds.

3.3.4 Static Route Setting

Static routes are special routes that the network administrator manually enters into the router configuration. You could build an entire network based on static routes. The problem with doing this is that when a network failure occurs, the static route will not change without you performing the change. This isn't a good thing if the failure occurs during the middle of the night, or while you are on vacation.

The route table allows the user to configure and define all the static routes supported by the router.

Enable: Enable/Disable the static route.

Type: Indicates the type of route as follows, Host for local connection and Net for network connection.

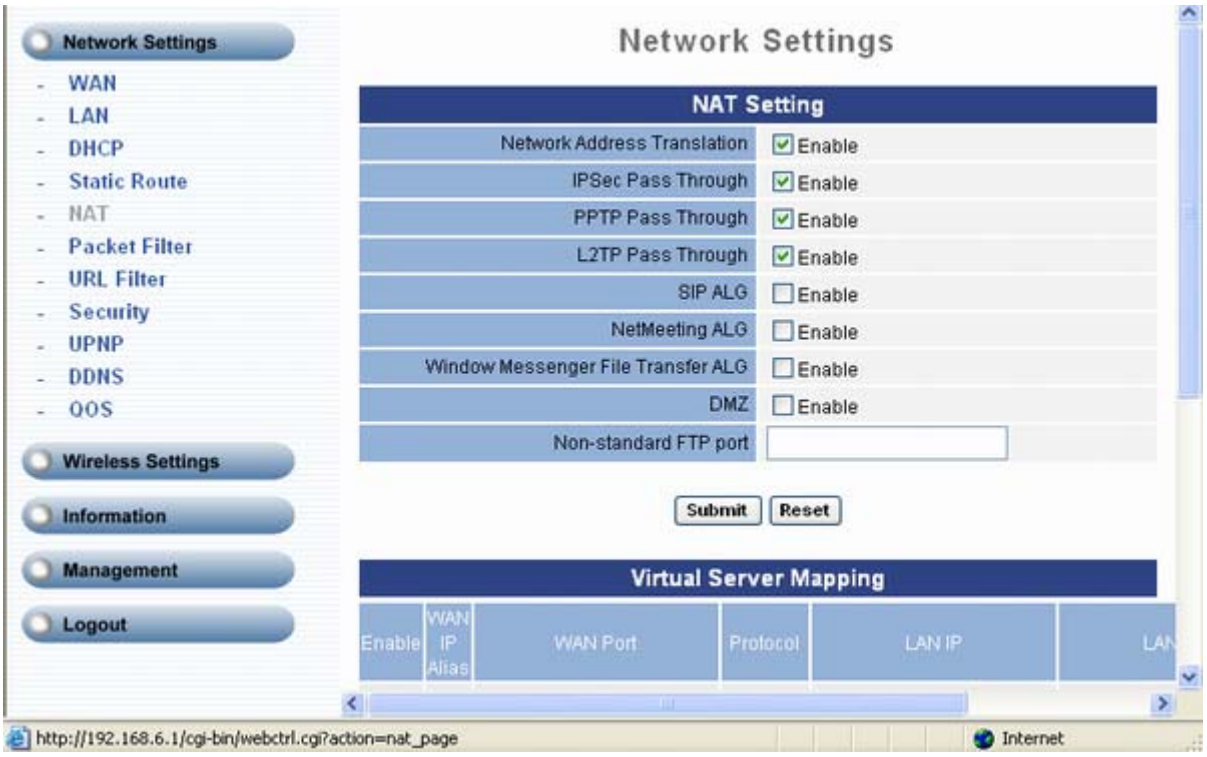
Target: Defines the base IP address (Network Number) that will be compared with the destination IP address (after an AND with NetMask) to see if this is the target route.

NetMask: The subnet mask that will be AND'd with the destination IP address and then compared with the Target to see if this is the target route.

Gateway: The IP address of the next hop router that will be used to route traffic for this route. If this route is local (defines the locally connected hosts and Type = Host) then this IP address MUST be the IP address of the router

Action: Add a new Static Route entry or update a specified entry.

3.3.5 NAT Setting



Network Address Translation: Enable/Disable NAT.

IPSec Pass Through: IPsec (Internet Protocol Security) is a framework for a set of protocols for security at the network or packet processing layer of network communication. Enable/Disable this framework verification.

PPTP Pass Through: PPTP (Point-to-Point Tunneling Protocol) is a protocol that allows corporations to extend their own corporate network through private "tunnels" over the public Internet. Enable/Disable this protocol verification.

L2TP Pass Through: L2TP (The Layer 2 Tunnel Protocol) is an emerging Internet Engineering Task Force (IETF) standard that combines the best features of two existing tunneling protocols: Cisco's Layer 2 Forwarding (L2F) and Microsoft's Point-to-Point Tunneling Protocol (PPTP). L2TP is an extension to the Point-to-Point Protocol (PPP), which is an important component for VPNs. VPNs allow users and telecommuters to connect to their corporate intranets or extranets. Enable/Disable this function.

SIP ALG: SIP, the Session Initiation Protocol, is a signaling protocol for Internet conferencing, telephony, presence, events notification and instant messaging. Enable/Disable this protocol verification.

NetMeeting ALG: Enable/Disable this protocol verification.

Window Messenger File Transfer ALG: Enable/Disable this protocol verification.

DMZ: In computer networks, a DMZ (Demilitarized Zone) is a computer host or small network added as a "neutral zone" between a company's private network and the outside public network. It prevents outside users from getting direct access to a server that has company data.

Think of DMZ as the front yard of your house. It belongs to you and you may put some things there, but you would put anything valuable inside the house where it can be properly secured.

Virtual Server Mapping

A Virtual Server is defined as a service port, and all requests to this port will be redirected to the computer specified by the server IP.

Enable: Enable/Disable the virtual server mapping, default setting is Disable.

WAN Port: The port number on the WAN side that will be used to access the virtual service. Enter the WAN Port number, e.g. enter 80 to represent the Web (http server), or enter 25 to represent SMTP (email server). Note: You can specify maximum 32 WAN Ports.

Protocol: The protocol used for the virtual service. Select a protocol type is TCP or UDP.

LAN IP: The server computer in the LAN network that will be providing the virtual services. Enter the IP address of LAN.

LAN Port: The port number of the service used by the Private IP computer. Enter the LAN port number.

Action: Add a new WAN port or update a specified WAN port.

Port Trigger

Some applications require multiple connections, such as Internet gaming, video conferencing, Internet telephony and others. These applications have difficulties working through NAT (Network Address Translation). If you need to run applications that require multiple connections, specify the port normally associated with an application in the "Trigger Port" field, select the protocol type as TCP (Transmission Control Protocol) or UDP (User Datagram Protocol), then enter the public ports associated with the trigger port to open them for inbound traffic.

Enable: Enable/Disable the port trigger, default setting is Disable.

Trigger Port: This is the port used to trigger the application. It can be either a single port or a range of ports.

Trigger Type: This is the protocol used to trigger the special application.

Public Port: This is the port number on the WAN side that will be used to access the application. You may define a single port or a range of ports. You can use a comma to add multiple ports or port ranges.

Public Type: This is the protocol used for the special application.

Action: Add a new Port Trigger or update a specified Port Trigger.

Port Forward

Enable: Enable/Disable the port forward, default setting is Disable.

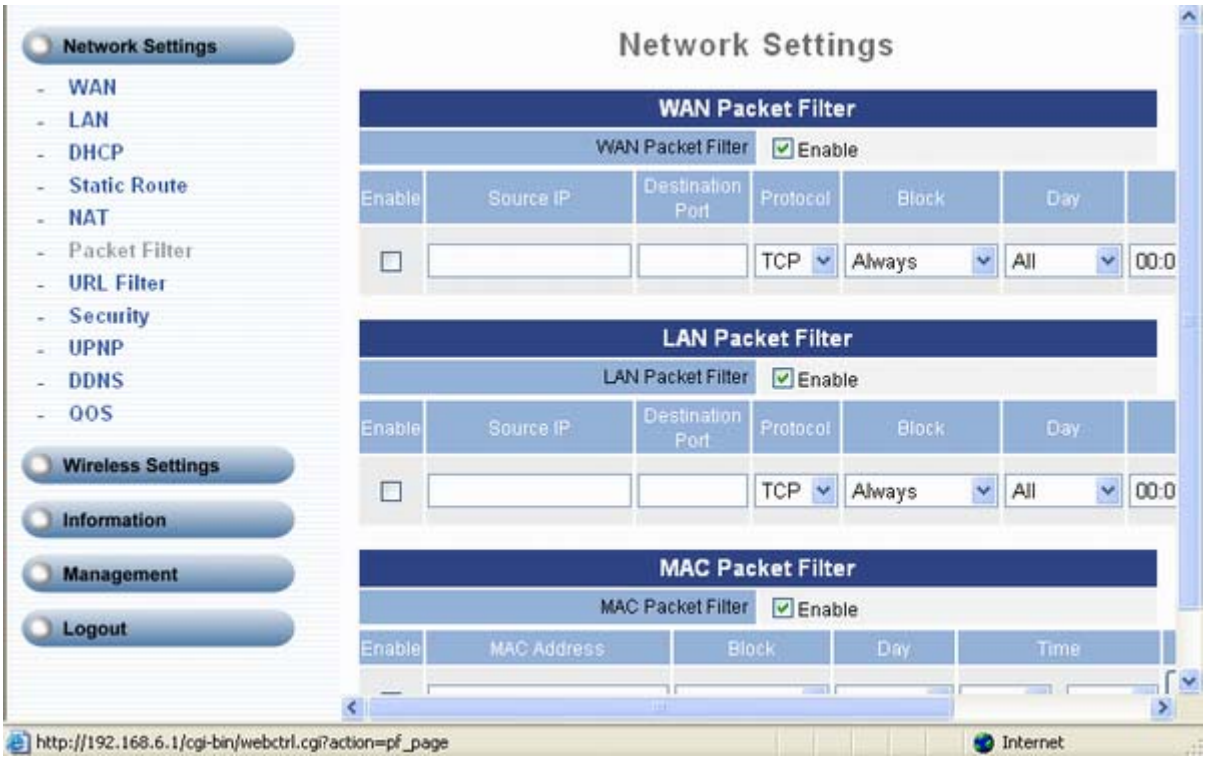
Forward Port: This is the port used to forward the application. It can be either a single port or a range of ports.

Forward Type: This is the protocol used to forward the special application.

Forward IP: This is the IP address you want to forward.

Action: Add a new Port forward or update a specified Port Forward.

3.3.6 Packet Filter Setting



WAN – Packet Filter

Use IP Filters to deny particular WAN IP addresses from the Internet. You can deny special port number or all ports for a specific IP address. You will only need to input the WAN IP address(es) of the computer(s) that will be denied.

Enable: Enable/Disable the WAN packet filter, default setting is Disable.

Source IP: The IP address of the WAN computer that will be denied access to the Internet. You can also add a range of IP addresses.

Destination Port: The single port or port range that will be denied to access. If no port is specified, all ports will be denied access.

Protocol: This is the protocol type that will be used with the Port that will be blocked.

Block: You can block the IP address of the WAN computer always or by schedule.

Day: If Block set to “by schedule”, you need to determine which day(s) will be performed.

Time: If Block set to “by schedule”, you need to determine which time will be performed.

Action: Add a new WAN packet filter or update a specified WAN packet filter.

LAN – Packet Filter

Use IP Filters to deny particular LAN IP addresses from accessing the Internet. You can deny special port number or all ports for a specific IP address. You will only need to input the LAN IP address(es) of the computer(s) that will

be denied Internet access.

Enable: Enable/Disable the LAN packet filter, default setting is Disable.

Source IP: The IP address of the LAN computer that will be denied access to the Internet. You can also add a range of IP addresses.

Destination Port: The single port or port range that will be denied access to the Internet. If no port is specified, all ports will be denied access.

Protocol: This is the protocol type that will be used with the Port that will be blocked.

Block: You can block the IP address of the WAN computer always or by schedule.

Day: If Block set to “by schedule”, you need to determine which day(s) will be performed.

Time: If Block set to “by schedule”, you need to determine which time will be performed.

Action: Add a new LAN packet filter or update a specified LAN packet filter.

MAC – Packet Filter

Use MAC Filters to deny computers within the local area network from accessing the Internet. You can either manually add a MAC address or select the MAC address from the list of clients that are currently connected to the unit.

Enable: Enable/Disable the MAC packet filter, default setting is Disable.

MAC Address: The MAC address of the computer in the LAN (Local Area Network) to be used in the MAC filter table. Enter the MAC address of LAN port, e.g. 00:00:27:88:81:18.

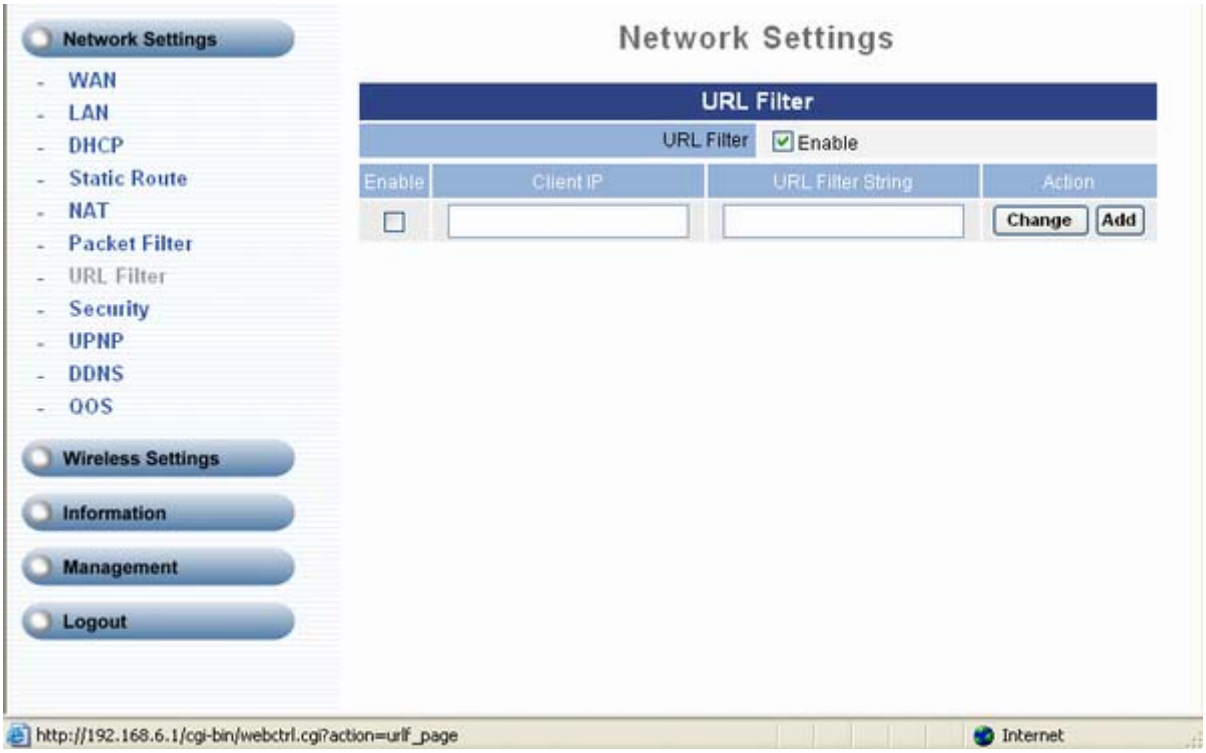
Block: You can block the MAC address of the LAN computer always or by schedule.

Day: If Block set to “by schedule”, you need to determine which day(s) will be performed.

Time: If Block set to “by schedule”, you need to determine which time will be performed.

Action: Add a new MAC packet filter or update a specified MAC packet filter.

3.3.7 URL Filter Setting



With security reason, the URL Filter provides the enterprise to manage and restrict employee access to non-business or undesirable content on the Internet. URL Filter is a web solution that blocks web-sites access according the URL Filter String no matter the URL string is found full or partial matched with a keyword.

For example, if you add URL Filter String with keyword “sex”, the ATA device will limit local hosts to access the web site or web pages such as “www.sex.com” or “www.fronthost.com/sex/index.html”.

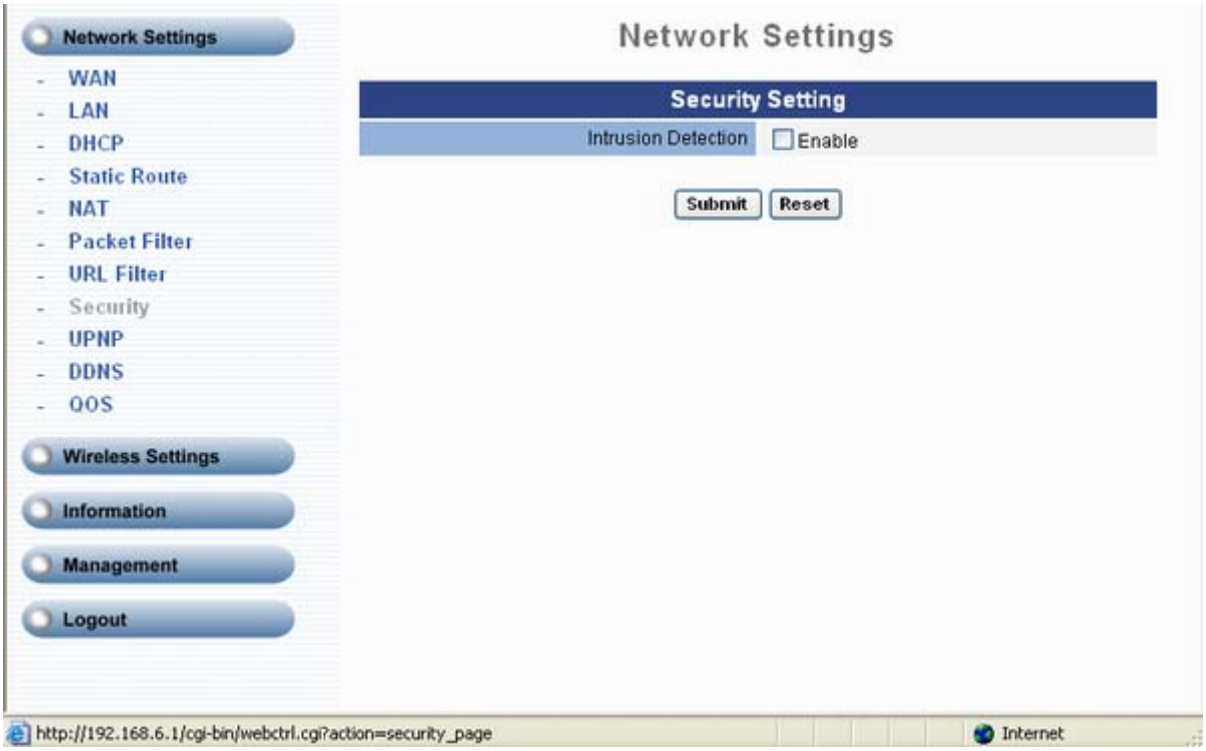
Enable: Enable/Disable the URL Filter, default setting is Disable.

Client IP: The host computer which will be blocked to access the Internet.

URL Filter String: The pattern which will be blocked. For example, “yahoo.com” or keyword “sex”.

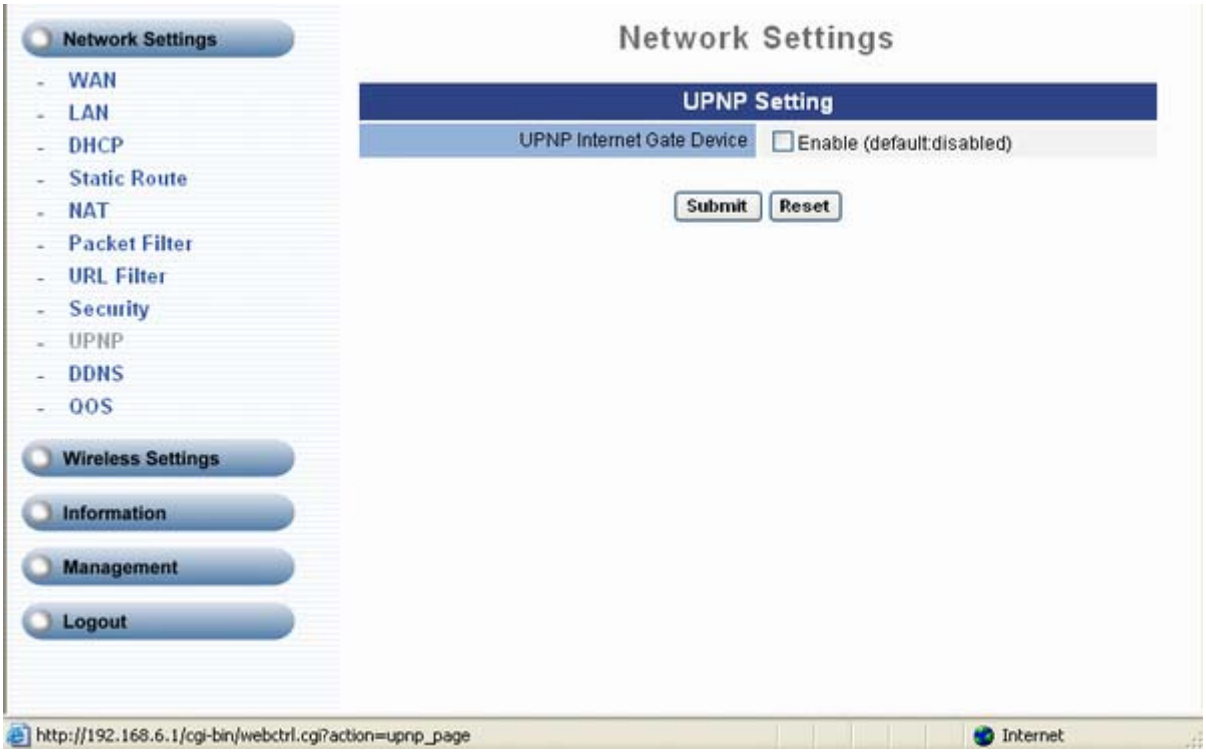
Action: Add a new URL Filter or update a specified URL Filter.

3.3.8 Security Setting



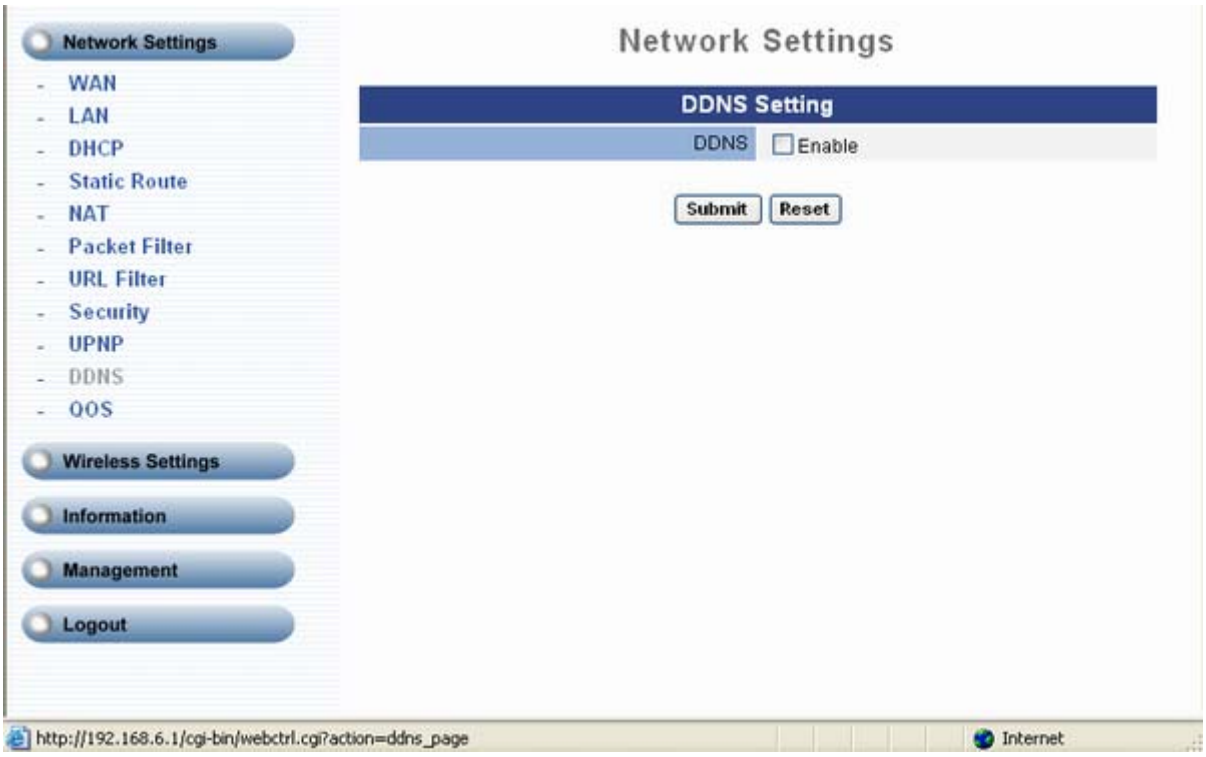
Intrusion Detection: Enable/Disable the intrusion detection.

3.3.9 UPNP Setting



UPnP (Universal Plug-and-Play). Network architecture based on TCP/IP and intended to allow terminals to be networked without the need for configuration. In the Barricade router, for example, the correct ports are automatically opened for applications like Net meeting, online games, etc. You can choose to enable or disable the UPnP Service.

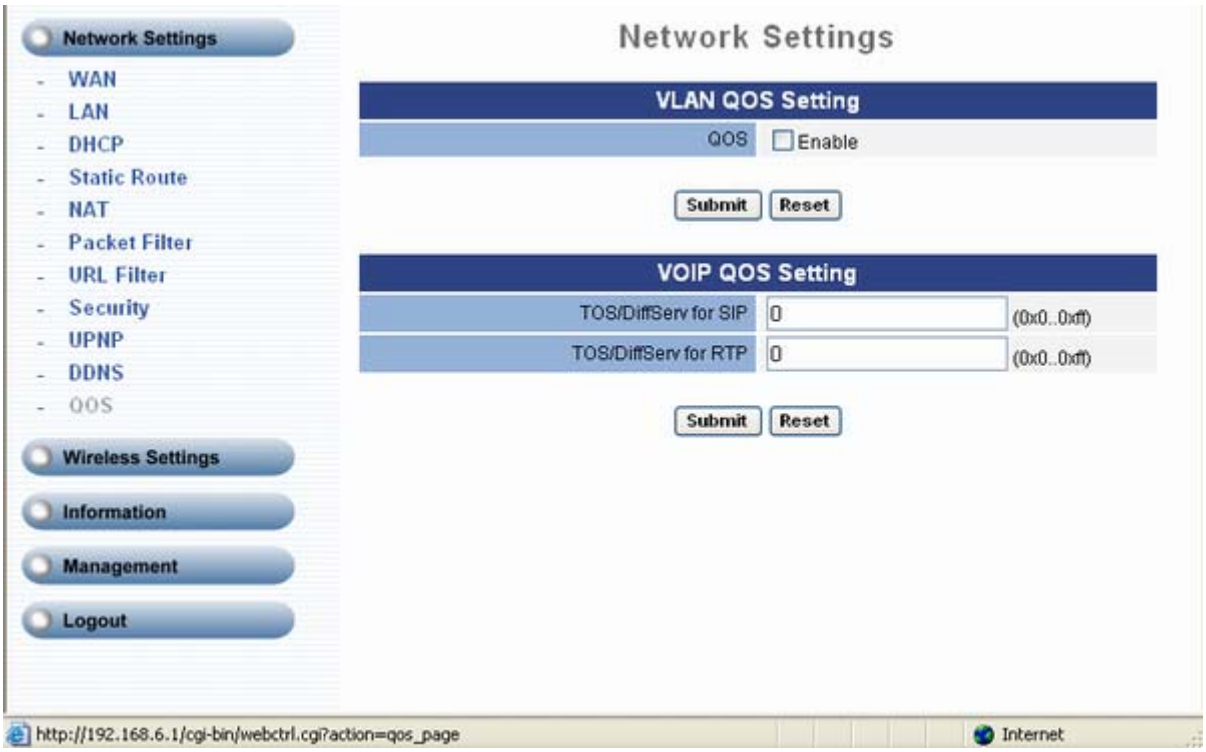
3.3.10 DDNS Setting



DDNS is a method of keeping a domain name linked to a changing (dynamic) IP address. With most Cable and DSL connections, you are assigned a dynamic IP address and that address is used only for the duration of that specific connection. User can setup your DDNS service and the device will automatically update your DDNS server every time it receives a different IP address.

Enable: Enable/Disable the DDNS service, default setting is Disable.
DDNS Server Type: The device support two types of DDNS, DynDns.org or No-IP.com
DDNS Username: The username which you register in DynDns.org or No-IP.com website.
DDNS Password: The password which you register in DynDns.org or No-IP.com website.
Confirmed Password: Confirm the password which you typing.
Hostname to register: The hostname which you register in DynDns.org or No-IP.com website.

3.3.11 QOS Setting



The QOS (Quality Of Service) is to guarantee that the Voice and Data should be transmitting at the same time and Data couldn't influence the Voice quality. When TOS bits is enabled, it will guarantee the Voice have the first priority pass through the TOS enable devices.

QOS: Enable/Disable the QOS Service. Default setting is disable.

Voice VLAN Priority: The priority value for voice packet. Default is 1.

Voice VLAN ID: The voice VLAN ID. Default is 3.

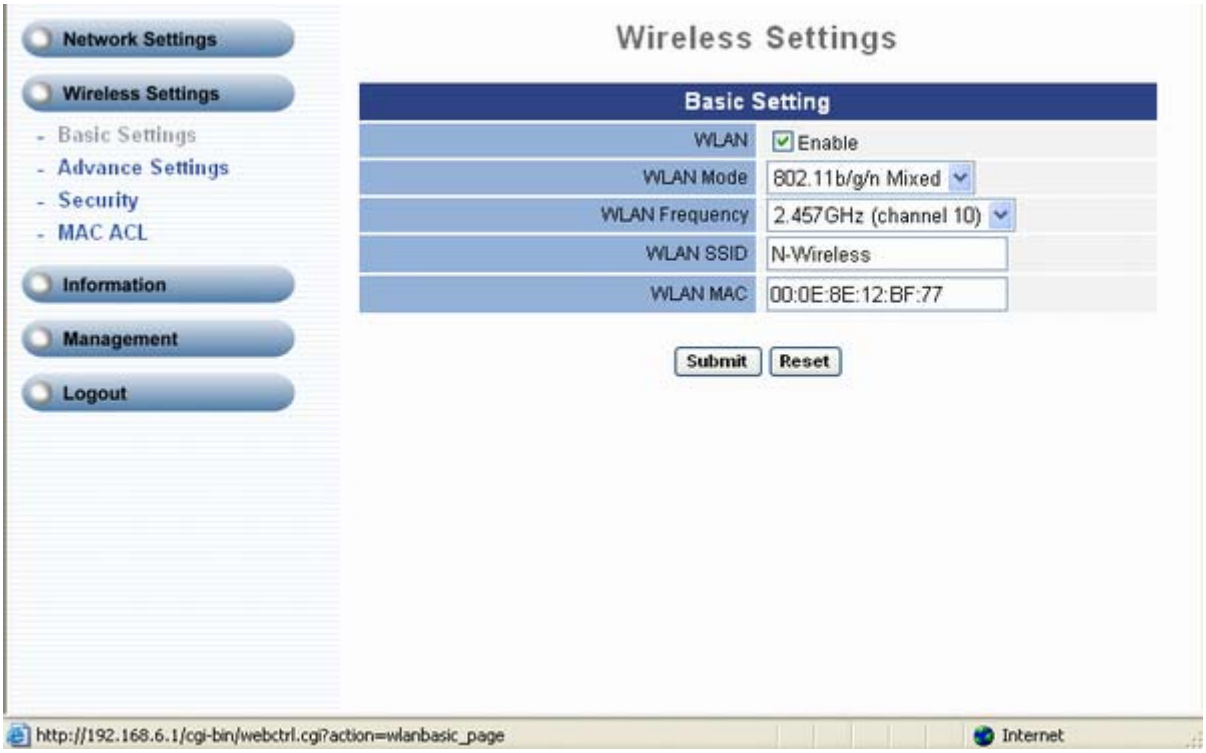
Data VLAN Priority: The priority value for data packet. Default is 0.

Data VLAN ID: The data VLAN ID. Default is 4.

SIP TOS/DiffServ: This option enables the phone to support QOS for SIP traffic in a network. This makes sense only if all parts of the involved network also support QOS. Assign the priority value from 0 to 255. Default is 0.

RTP TOS/Diffserv: This option enables the phone to support QOS for RTP traffic in a network. This makes sense only if all parts of the involved network also support QOS. Assign the priority value from 0 to 255. Default is 0.

3.4.1 Basic Setting



WLAN: Enable/Disable the Wireless LAN feature. Default is enable.

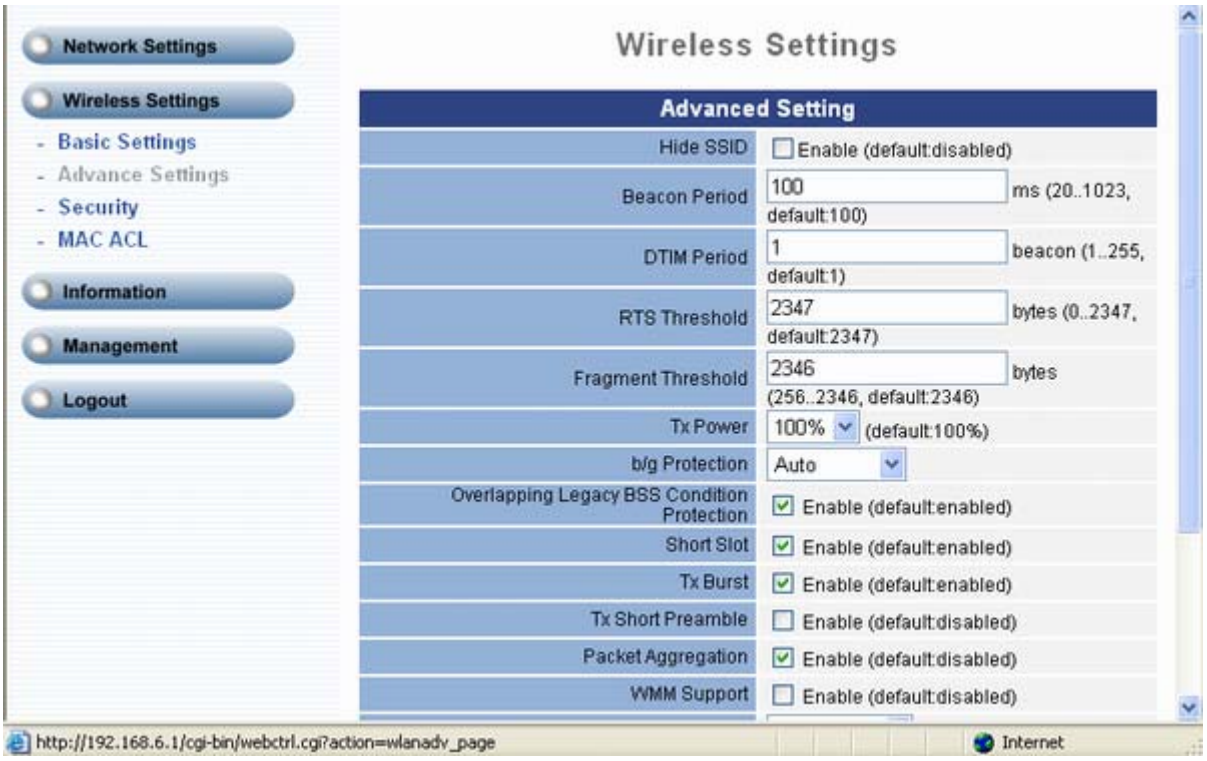
WLAN Mode: Choose a mode from the pull-down menu. Make sure that you have the equipment you need. As you're looking for products in stores or on the Internet, you might notice that you can choose equipment that supports five different wireless networking technologies: 802.11b/g/n Mixed, 802.11b/g Mixed, 802.11b, 802.11g and 802.11n.

WLAN Frequency: Choose a frequency from the pull-down menu.

WLAN SSID: Specify the wireless network name.

WLAN MAC: Specify the MAC address of your Wireless LAN.

3.4.2 Advance Setting



Hide SSID: Hide SSID to secure your network. Default is disable.

Beacon Period: Choosing beacon period for improved response time for wireless http clients.

DTIM Period: The DTIM period indicated how many beacon frames can transmit before another DTIM is transmitted.

RTS Threshold: RTS stands for “Request to Send”. This parameter controls what size data packet the low level RF protocol issues to an RTS packet. Default is 2347.

Fragment Threshold: When transmitting a packet over a network medium, sometimes the packet is broken into several segments, if the size of packet exceeds that allowed by the network medium. The Fragmentation Threshold defines the number of bytes used for the fragmentation boundary for directed messages.

Tx Power: TX Power measurement. Default is 100%.

b/g Protection: A protection mechanism prevents collisions among 802.11b/g nodes.

Overlapping Legacy BSS: It’s an option to enable/disable Overlapping Legacy BSS Condition Protection(OLBC)

Short Slot: When short slot is enabled, the wireless device uses the short slot time only when all clients associated to the 802.11g, 2.4GHz radio supports short slot time. Short slot time is an 802.11g only feature and does not apply to 802.11a radios.

Tx Burst: Enable the transmitted time slot can increase transmission throughput.

Tx Short Preamble: Specify the Preamble type is short preamble or long preamble.

Packet Aggregation: The parameter can be used to increase the delivered bandwidth in community networks including fixed and mobile stations.

WMM Support: Enable/disable the WMM support.

802.11h Support: Enable/disable the 802.11h support.

Channel Switch Period: If you enable 802.11h Support, specify the channel in beacon value.

HT Operation Mode: Mixed mode operation: In this mode, both the MIMO-OFDM systems and the legacy systems shall co-exist. The MIMO system should have the capability to generate legacy packets for the legacy systems and high throughput packets for MIMO-OFDM systems. So, the burst structure should be decodable to **legacy systems and should provide better performance to MIMO-systems.**

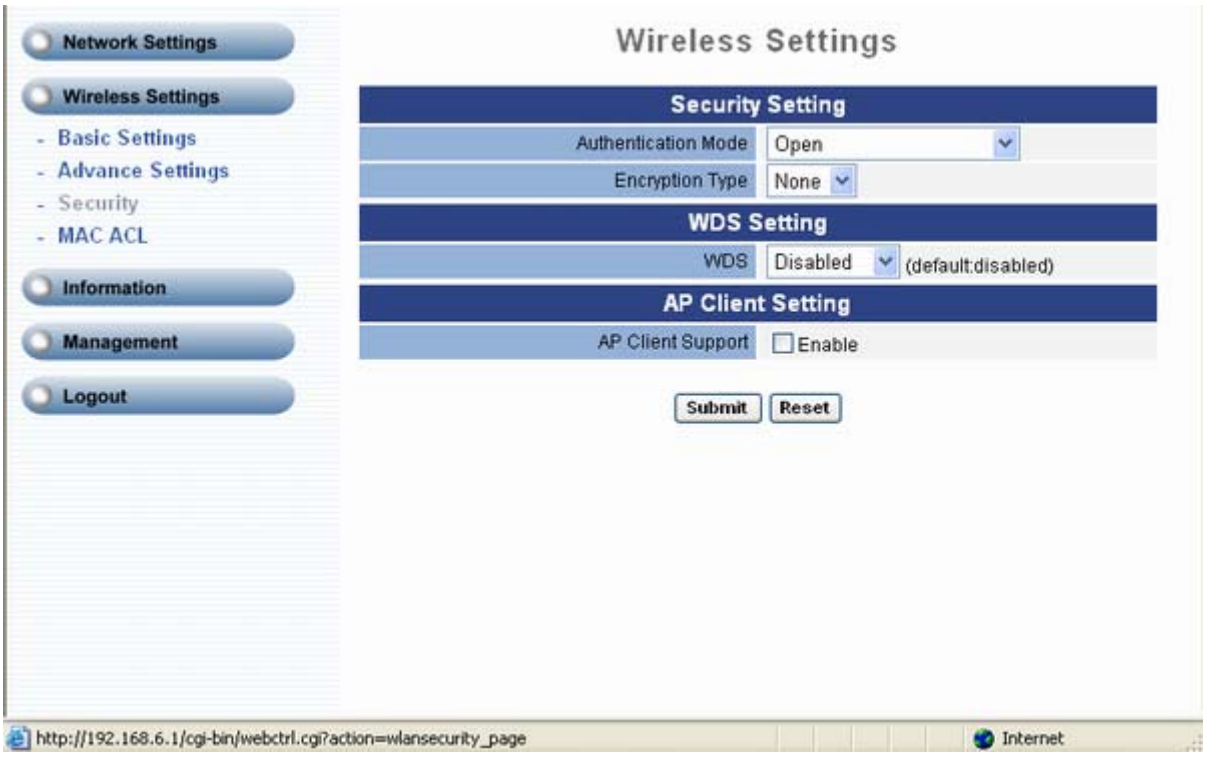
Green field mode operation: This mode is similar to mixed mode where the transmission happens only between the MIMO-OFDM systems in the presence of legacy receivers. However, the MIMO-OFDM packets transmitted in this mode will have only MIMO specific preambles and no legacy format preambles are present.

HT Channel Bandwidth: Specify the channel bandwidth.

HT Guard Interval: Guard-interval is used to reduce interference of multi-path channel. Specify the guard interval is 400 ns or 800 ns to increase throughput.

HT TX Aggregate MSDU: This option allows aggregation of multiple MSDUs in one MPDU.

3.4.3 Security Setting



This function allows you setup the wireless security. Turn on WEP or WPA by selecting Authentication mode could prevent any unauthorized access to your wireless network.

WEP

WEP aims to provide security by encrypting data over radio waves so that it is protected as it is transmitted from one end point to another. However, it has been found that WEP is not as secure as once believed.

Select Authentication Mode as Open, Shared, or WEP Auto; and then Specify Encryption. Type as “WEP” can prompt the setting page.

Default Key ID: Specify which key is used for encryption.

Key1 to Key4: Enter the key value depending on selected ASCII or Hexadecimal.

WPA/WPA2

Wi-Fi Protected Access(WPA and WPA2) is a class of systems to secure wireless computer networks. WPA is designed to work with all wireless network interface cards, but not necessarily with first generation wireless access points. WPA2 implements the full standard, but will not work with some older network cards. Both provide good security, with two significant issues:

Ether WPA or WPA2 must be enabled and chosen in preference to WEP. WEP is usually presented as the first security choice in most installation instructions.

In the “Personal” mode, the most likely choice for homes and small offices, a pass phrase is required that, for full security, must be longer than the typical 6 to 8 character passwords users are taught employ.

WPA2 Personal

Encryption Type: Select the encryption type (TKIP or AES) for data encryption.

WPA/WPA2 Pre-Shared Key: Pre-shared key mode (PSK, alos known as personal mode) is designed for home and small office networks that cannot afford the cost and complexity of an 802.1x authentication server. Each user must enter a pass phrase to access the network. It can be a password like “jeanY-13i”, a pass phrase like “Idaho hung gear id gene”, or a hexadecimal string like “65E4 E556 8622 EEE1”. A pre shared key is a password which is entered to access a secure WiFi system sing WEP or WPA. Both the wireless access point (AP) and the client share the same key.

WPA ReKey Method: Specify the ReKey method (by Time or by Packet). Default is disable.

WPA PeKey Interval: If you enable WPA ReKey method, then specify the interval.

Pairwise Master Key Cache Interval: In the Fast Roaming section, you can configure Pairwise Master Key (PMK) caching and pre-authentication options. PMK Cache Interval: The number of minutes before deletion (and renewal) of the Pairwise Master Key used for authentication.

Pre-Authentication Support: According to some of the preferred embodiments, a method for proactively establishing a security association between a mobile node in a visiting network and an authentication agent in another network to which the mobile node can move includes: negotiating pre-authentication using a flag in a message header that indicates security association; and one of the mobile node and the authentication agent initiating pre-authentication by transmitting a message with the flag set in its message header, and the other of the mobile node and the authentication agent responding with the flags set in its message header only if it supports the pre-authentication. Enable/disable pre-authentication support. Default is disable.

WPA/WPA2 Enterprise

Encryption Type: Select the encryption type (TKIP or AES) for data encryption.

WPA ReKey Method: Specify the ReKey method (by Time or by Packet). Default is disable.

WPA PeKey Interval: If you enable WPA ReKey method, then specify the interval.

Pairwise Master Key Cache Interval: In the Fast Roaming section, you can configure Pairwise Master Key (PMK) caching and pre-authentication options. PMK Cache Interval: The number of minutes before deletion (and renewal) of the Pairwise Master Key used for authentication.

Pre-Authentication Support: According to some of the preferred embodiments, a method for proactively establishing a security association between a mobile node in a visiting network and an authentication agent in another network to which the mobile node can move includes: negotiating pre-authentication using a flag in a message header that indicates security association; and one of the mobile node and the authentication agent initiating pre-authentication by transmitting a message with the flag set in its message header, and the other of the mobile node and the authentication agent responding with the flags set in its message header only if it supports the pre-authentication. Enable/disable pre-authentication support. Default is disable.

Radius Server Network: The communication between the RADIUS client and the RADIUS server are authenticated and encrypted through the use of a shared secret, which is not transmitted over the network. Select

the network is WAN or LAN.

Radius Server Address: Enter IP address of radius server.

Radius Server Port: Enter port number of radius server. Default is 1812.

Radius Server Key: Enter a string for certificating.

WDS Setting

WDS:

Restricted – WDS peers must be registered with AP router (by MAC addresses)

Bridge – AP router will function as a wireless bridge, merely forwarding traffic between access points, and will not respond to wireless requests. The WDS peers must be manually stated and wireless stations will not be able to connect to AP router.

Repeater – AP router will act as a repeater, interconnecting between access points. WDS peers can be determined by the user (Restricted mode) or auto-detected (Lazy mode)

WDS Encryption Type:

Lazy – Automatic detection of WDS peers. When a LAN user searches for a network, AP router will attempt to connect to WDS devices in its vicinity.

When the Authentication Mode is set as Open, Shared, or WEP auto; WEP is the only WDS encryption type.

When the Authentication Mode is set as WPA Personal or WPA2 Personal, the WDS encryption type can be TKIP or AES.

WDS WPA/WPA2 Pre-Shared Key:

Specify the pre-shared key to secure WDS, if your authentication mode is set as WPA Personal or WPA2 Personal.

WDS MAC List: Specify the destination MAC address device. The MAC address filter tunneling lets you select exactly which stations should have access to your network.

Note: When WDS is enabled, the WPA/WPA2 enterprise support will be unavailable.

AP Client

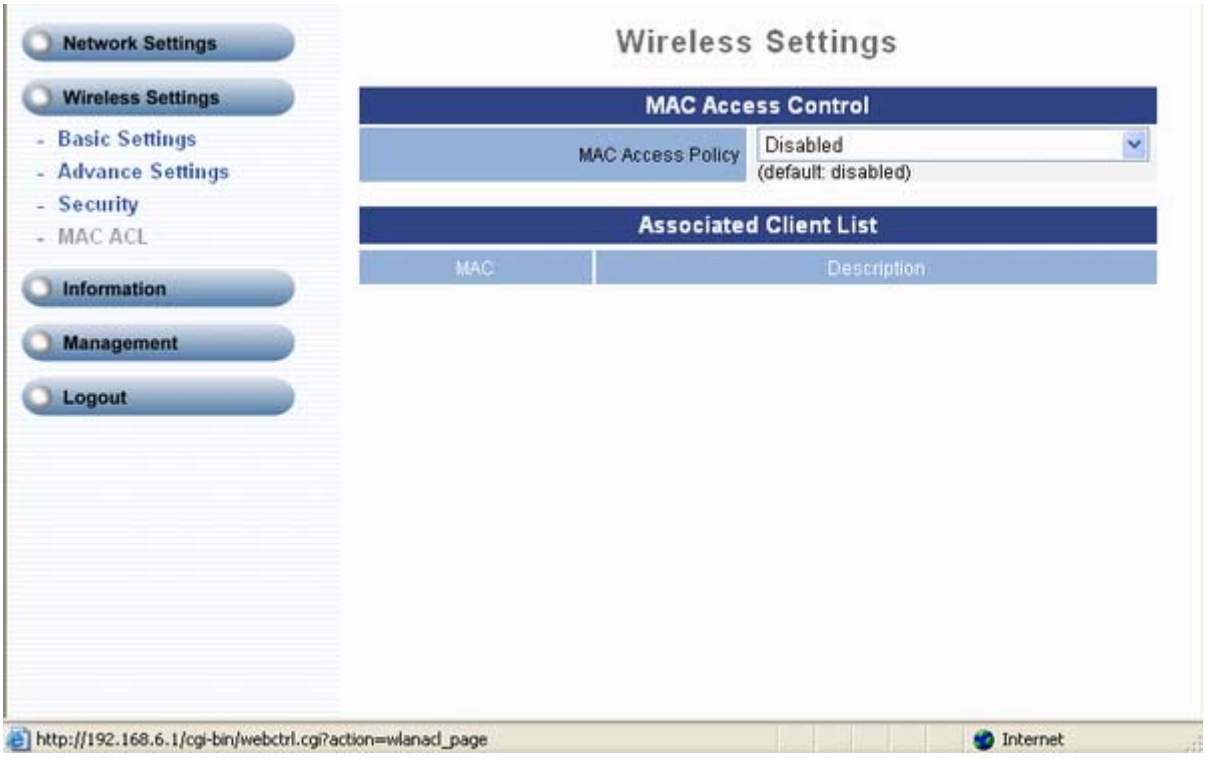
The AP client feature allows the AP to effectively become a wireless client of remote AP. When the AP client is enabled, both the wired and wireless clients can access the remote AP through this AP client.

Note:

1. When AP Client is enabled, the WPA/WPA2 enterprise support will be unavailable.

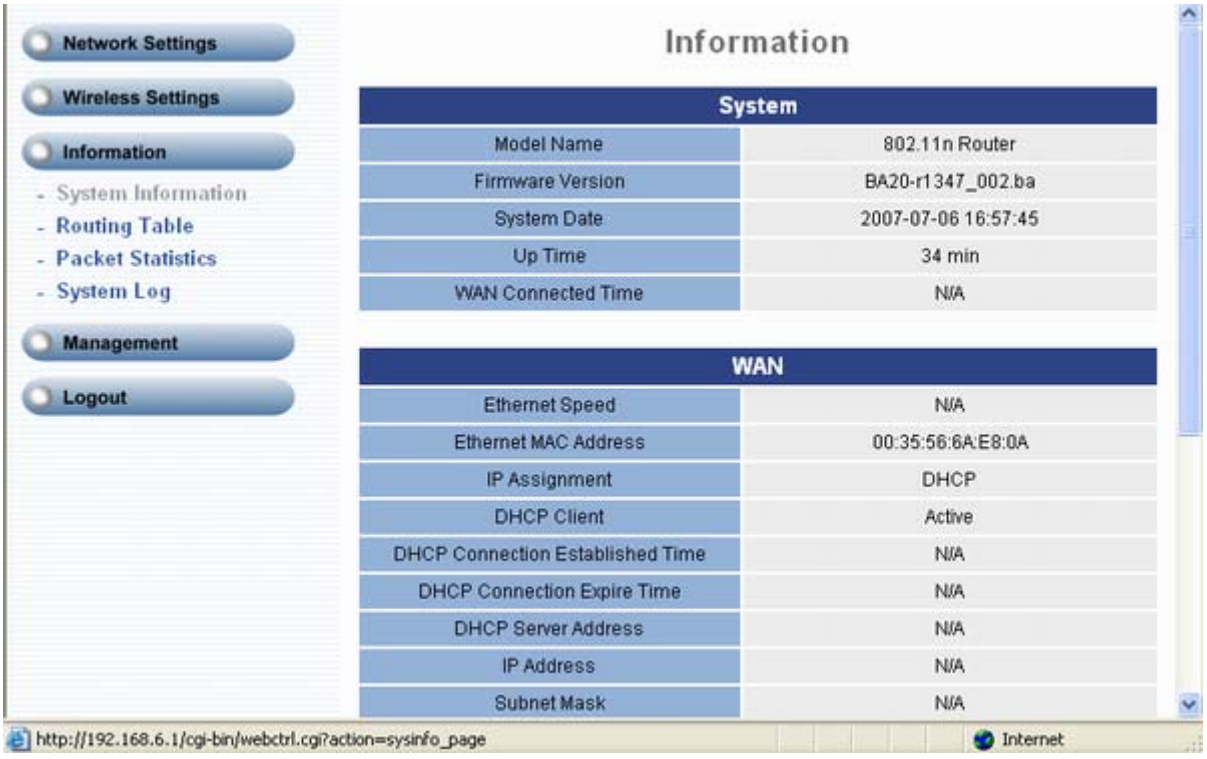
2. Please ensure the channel of the AP is the same as the remote AP which this AP client will connect to.

3.4.4 MAC ACL Setting



For Security reason, using MAC ACL's creates another level of difficulty to hacking a network. A MAC ACL is created and distributed to AP so that only authorized NIC's can connect to the network. While MAC address spoofing is a proven means to hacking a network this can be used in conjunction with additional security measures to increase the level of complexity of the network security decreasing the chance of a breach. MAC address can be add/delete/edit from the ACL list depending on the MAC Access Policy.

3.5.1 System Information



This page displays the current information for the device. It will display the LAN, WAN, and system firmware information. This page will display different information for you, according your WAN setting (Static IP, DHCP, or PPPoE).

If your WAN connection is set up for Dynamic IP address, there will be a Release button and Renew button. Use Release to disconnect from your ISP and use Renew to connect to your ISP.

If your WAN connection is set up for PPPoE, there will be a Connect button and Disconnect button. Use "Disconnect" to drop the PPPoE connection and use "Connect" to establish the PPPoE connection.

3.5.2 Routing Table

A routing table contains the information necessary to forward a packet along the best path toward its destination. Each packet contains information about its origin and destination. When a packet is received, a network device examines the packet and matches it to the routing table entry providing the best match for its destination. The table then provides the device with instructions for sending the packet to the next hop on its route across the network.

Destination: The IP address of the packet's final destination. The destination can be an IP address or a class-based, subnetted, or supernetted network ID.

Gateway: The IP address to which the packet is forwarded.

Netmask: Includes directly-attached subnets, indirect subnets that are not attached to the device but can be accessed through one or more hops, and default routes to use for certain types of traffic or wheninformation is lacking.

Flags: Possible flags include: **U**: route is up, **H**: target is a host, **G**: use gateway, **C**: cache entry, **!**: Reject route.

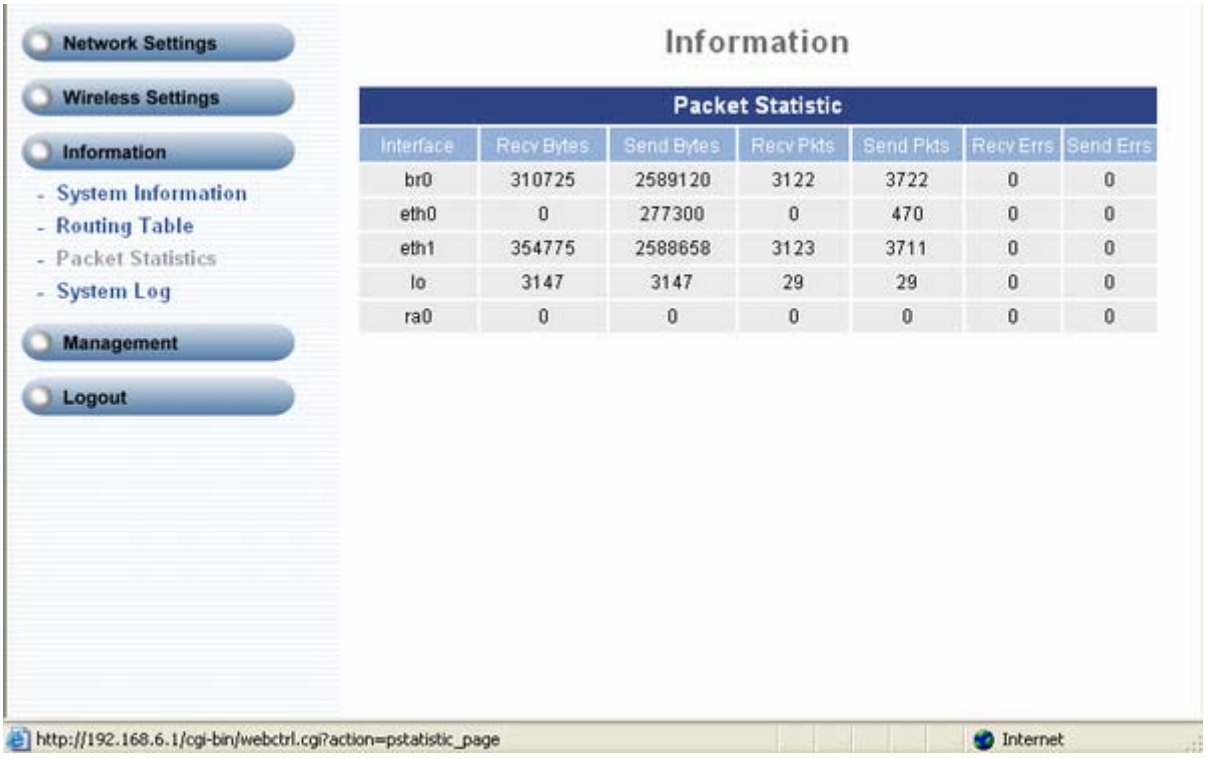
Metric: A number used to indicate the cost of the route so that the best route, among potentially multiple routes to the same destination, can be selected.

Ref: Number of references to this route.

Use: Count of lookups for the route.

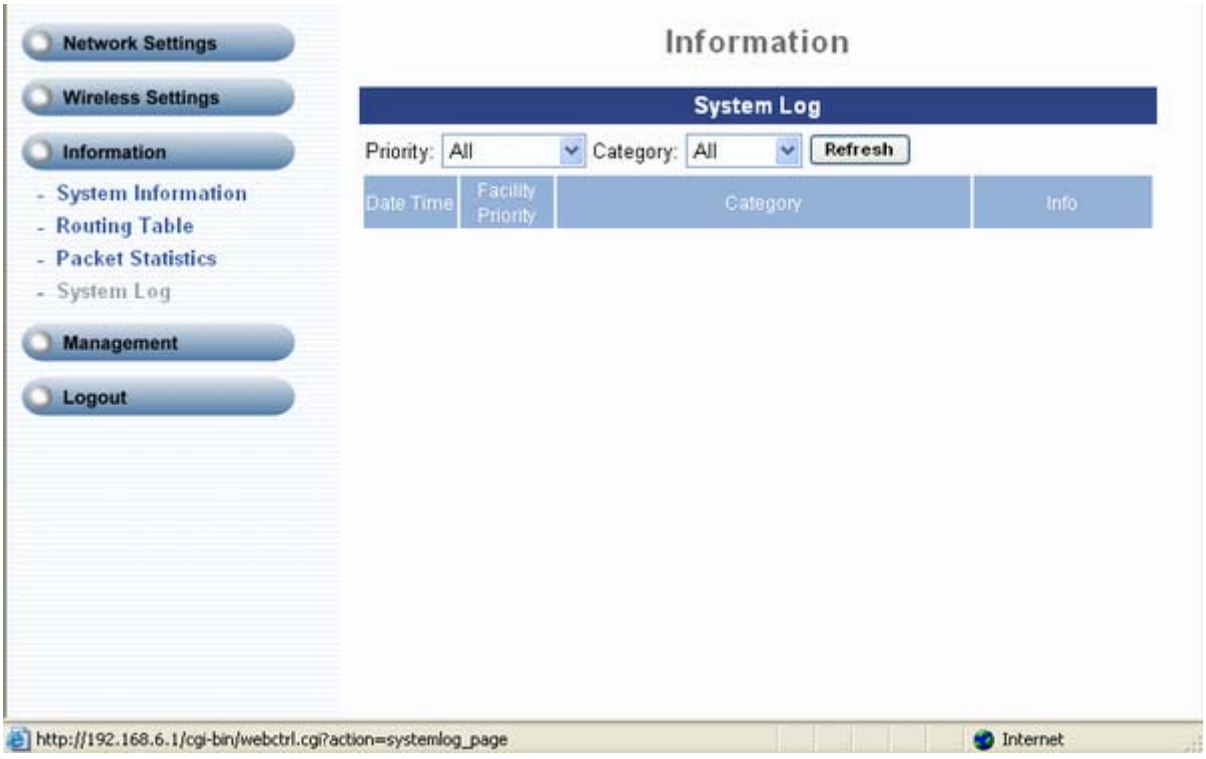
Iface: Interface to which packets for this route will be sent.

3.5.3 Packet Statistics



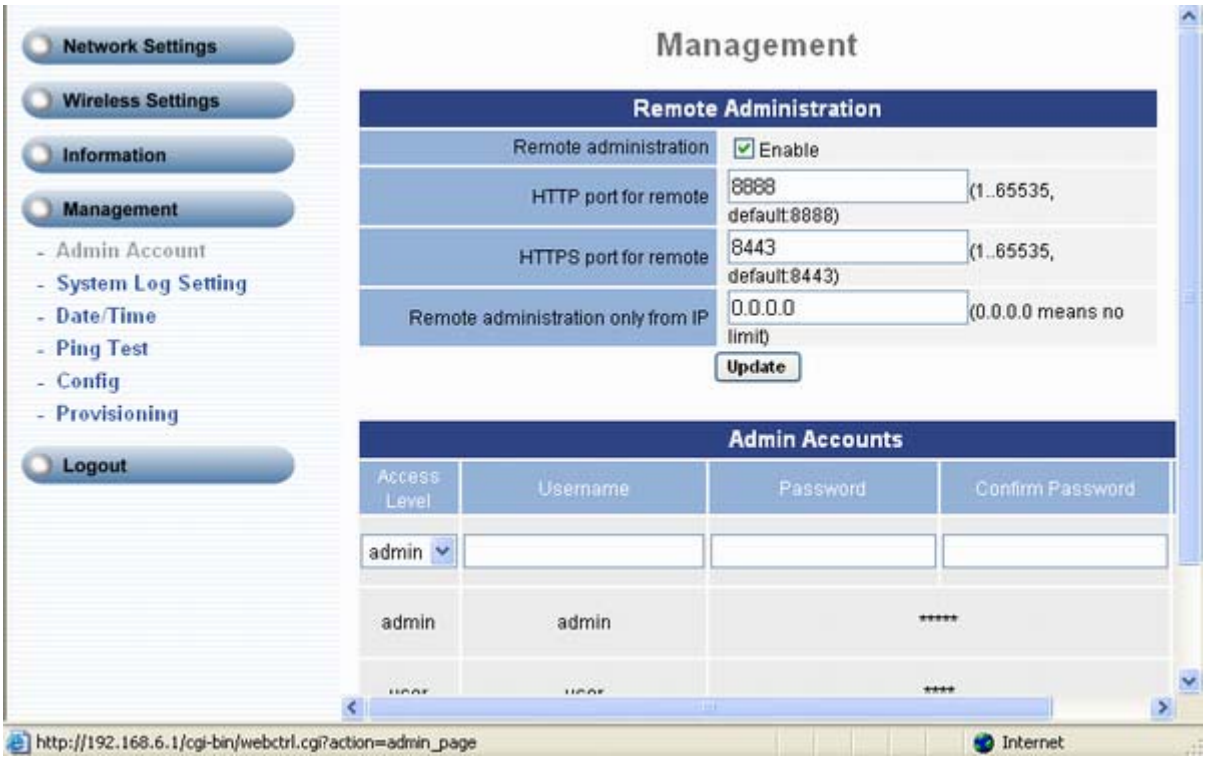
The device keeps statistic of the data traffic that it handles. You are able to view the amount of Receive and Sent packets that passes through the device on both the WAN port and the LAN ports. The traffic counter will reset when the device is rebooted.

3.5.4 System Log



The log file keeps a running log of events and activities occurring on the device. The log always displays recent logs. When the device is rebooted, the logs would not be cleared.

3.6.1 Admin Account



The administrator account can access the management interface through the web browser. Only the administrator account has the ability to change account password.

Administrator Name: Assign a name to represent the administrator account. Maximum 16 characters. Legal characters can be the upper letter “A” to “Z”, lower letter “a” to “z”, digit number “0” to “9” and an underscore sign” _” . The administrator name is case-sensitive. Note: the “blank” character is an illegal character

Administrator Password: Assign the administrator password, the Maximum 16 characters and minimum 6 characters. Mix the characters with the digits. Legal characters can be the upper letter “A” to “Z”, lower letter “a” to “z”, digit number “0” to “9” and an underscore sign”_”. The password is case-sensitive. Note: the “blank” character is an illegal character.

Confirm Password: Enter the administrator password again.

3.6.2 System Log Setting

The log file keeps a running log of events and activities occurring on the device. The log always displays recent logs. When the device is rebooted, the logs would not be cleared.

3.6.3 Data / Time

Date Time Set By: Manual Time Setting or NTP Time Server.

Manual Time Setting: If you choose this item, then go to the fields of Date Value Setting and Time Value Setting for setting time.

NTP Time Server: If you choose this item, then go to the filed of NTP Server Address to assign the domain name for NTP Server.

Time Zone: GMT (Greenwich Mean Time) is World Time and the basis of every world time zone which sets the time of day and is at the centre of the time zone map. GMT sets current time or official time around the globe. According to the location, select a time zone from the pull-down menu.

Daylight Saving: Daylight Saving Time begins for most of the United States at 2:00 a.m. on the first Sunday of April. Time reverts to standard time at 2:00 a.m. on the last Sunday of October. In the U.S., each time zone switches at a different time. In the European Union, Summer Time begins and ends at 1:00 a.m. GMT. It begins the last Sunday in March and ends the last Sunday in October. In the EU, all time zones change at the same moment.

Day Value Setting: Assign the day value from the pull-down menus.

Time Value Setting: Assign the time value from the pull-down menus.

NTP Update Interval: Configure how often to updates its system clock. This setting is based on hour inside the registry. Default is 24 hours.

NTP Server 1: Assign the domain name of the NTP Server 1.

NTP Server 2: Assign the domain name of the NTP Server 2.

3.6.4 Ping Test

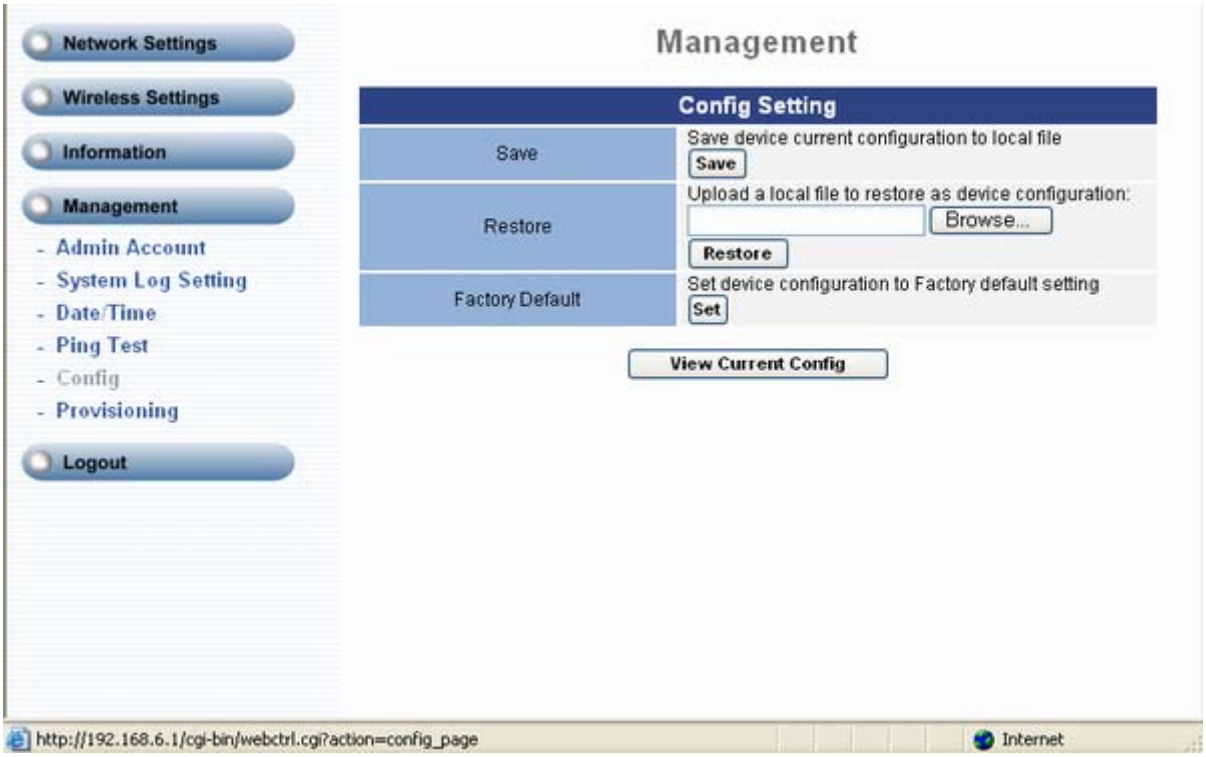
This useful diagnostic utility can be used to check if a computer is on the Internet. It sends ping packets and listens for replies from the specific host. Enter in a host name or the IP address that you want to ping (Packet Internet Groper) and click Ping.

Example:

yahoo.com or 216.115.108.245

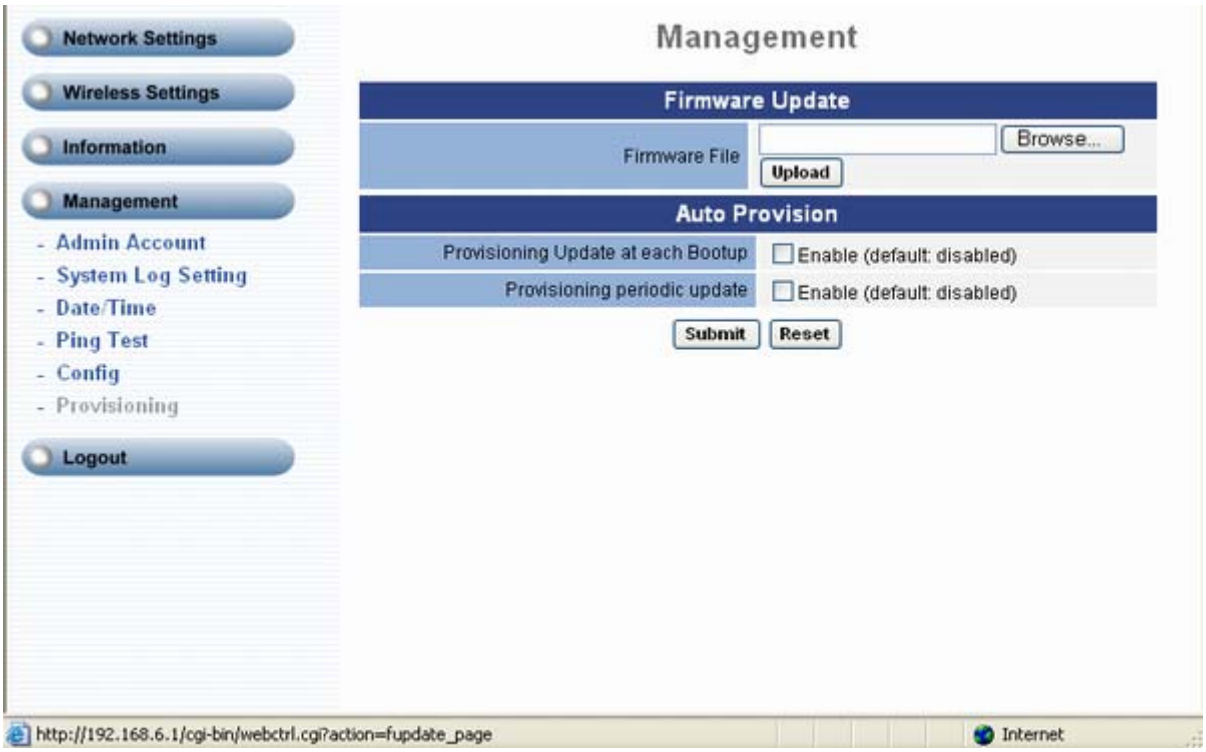
Ping Destination: Assign a legal IP address.

3.6.5 Config Setting



Save the current setting or restore a backup setting here. User can also reset the device to factory default here.

3.6.6 Provisioning



You can upgrade the firmware of the device using this tool. Make sure that the firmware you want to use is saved on the local hard drive of the computer. Click on Browse to search the local hard drive for the firmware to be used for the update. Upgrading the firmware will not change any of your system settings but it is recommended that you save your system settings before doing a firmware upgrade.

There are two ways to update firmware.
Upload the firmware to system manually. However, for the user may not familiar with the product, recommend to enable Auto-provisioning.
Auto-provisioning mechanism is a way which can automatically check for latest firmware and then upgrade it. It enables a system to always run with a newest or stable firmware.

3.7.1 Logout

If you need to logout administrator right for web-access, please click the Logout link.

The web system management interface will auto–logout with 1800 sec default value.

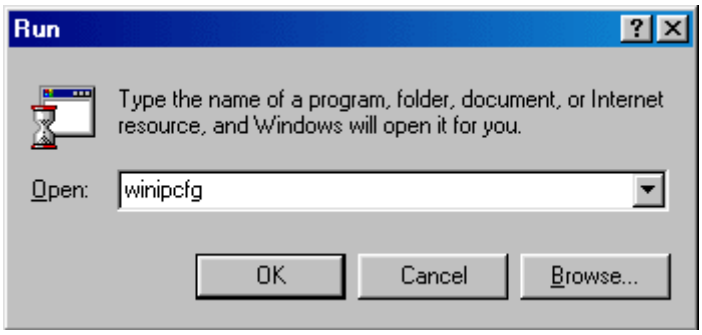
3.7.2 Reboot

If for any reason the device is not responding correctly, you may want to reboot the system.

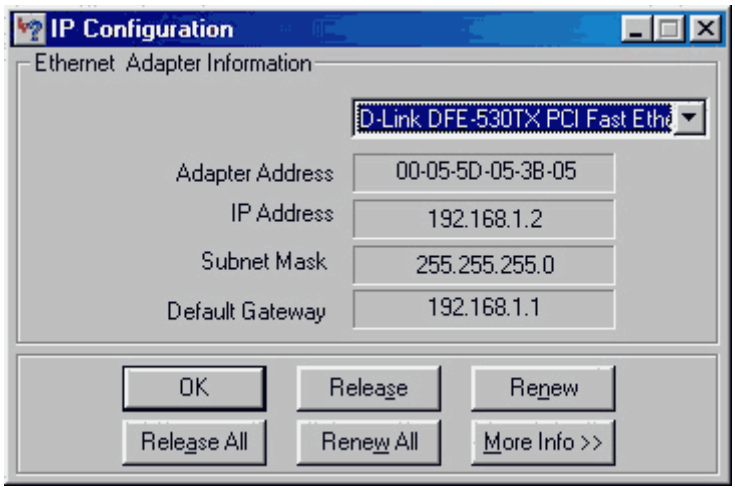
3.8.1 TCP/IP Settings for Windows Operating System

1. How can I find my IP Address in Windows 95, 98, or Me?

- Click on **Start**, then click on **Run**.
- The Run Dialogue Box will appear. Type **winipcfg** in the window as shown then click OK



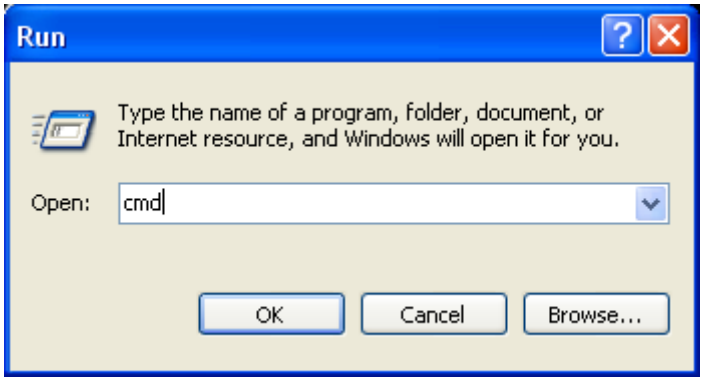
- The **IP Configuration** window will appear, displaying your **Ethernet Adapter Information**.
- Select your adapter from the drop down menu.
- If you do not see your adapter in the drop down menu, your adapter is not properly installed.



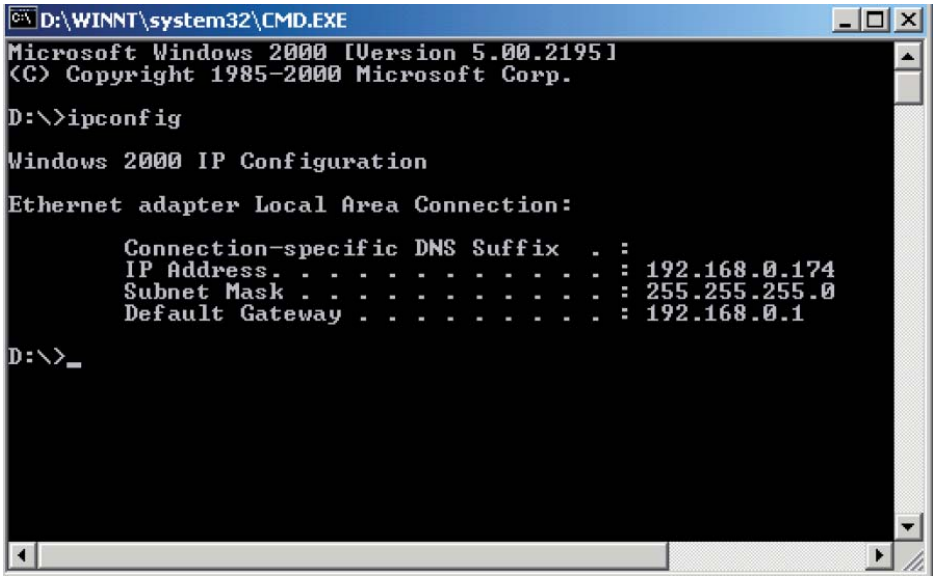
- After selecting your adapter, it will display your IP Address, subnet mask, and default router.
- Click **OK** to close the IP Configuration window.

2. How can I find my IP Address in Windows 2000/XP?

- Click on **Start** and select **Run**.
- Type **cmd** then click **OK**.



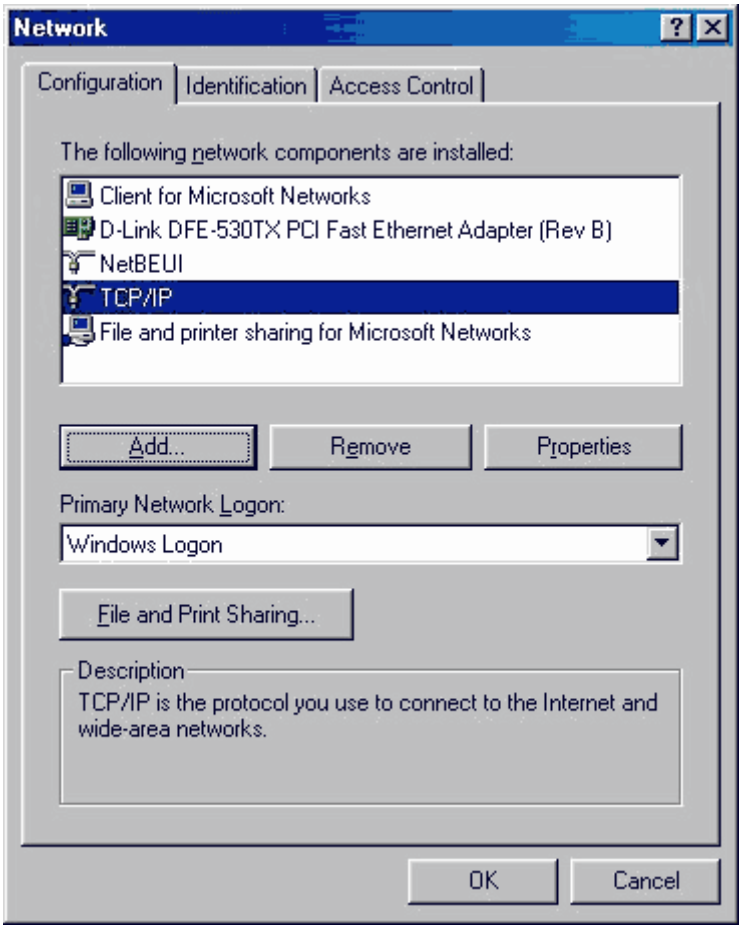
- From the Command Prompt, enter **ipconfig**. It will return your IP Address, subnet mask, and default router.


D:\WINNT\system32\CMD.EXE
Microsoft Windows 2000 [Version 5.00.2195]
(C) Copyright 1985-2000 Microsoft Corp.
D:\>ipconfig
Windows 2000 IP Configuration
Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . :
IP Address. . . . . : 192.168.0.174
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.0.1
D:\>

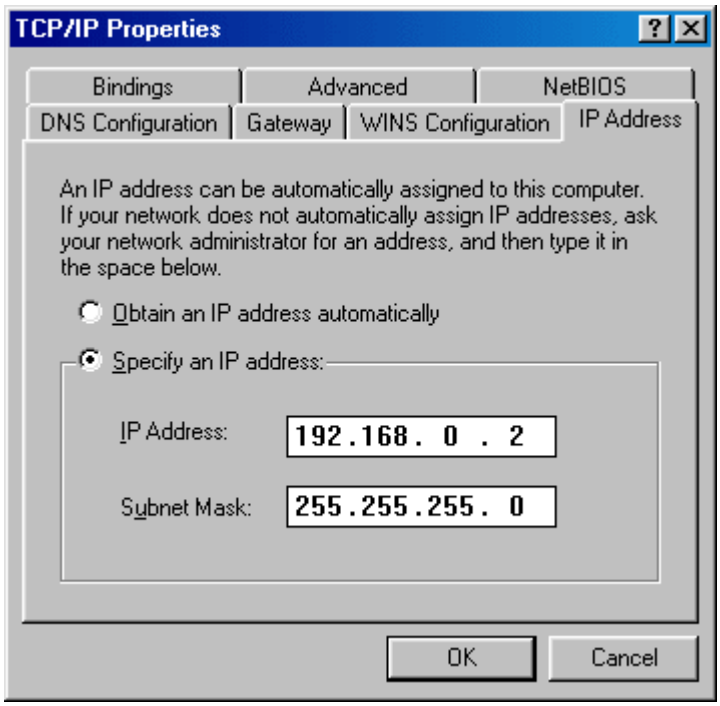
- Type exit to close the command prompt.
- Make sure you take note of your computer´s Default Router IP Address. The Default Router is the IP Address of the router. By default, it should be 192.168.0.1

3. How can I assign a Static IP Address in Windows 98/Me?

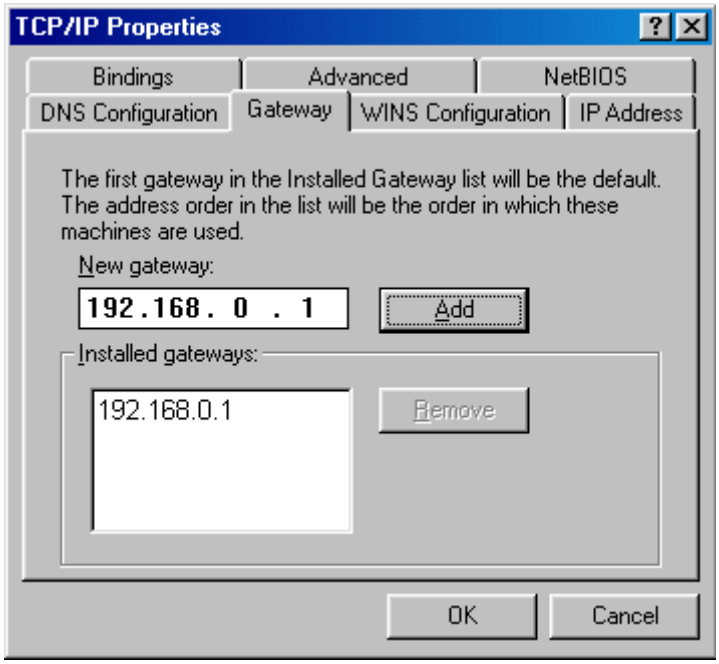
- From the desktop, right-click on the **Network Neighborhood** icon (Win ME - My Network Places) and select **Properties**.
- Highlight **TCP/IP** and click the **Properties** button. If you have more than 1 adapter, then there will be a TCP/IP “Binding” for each adapter. Highlight **TCP/IP > (your network adapter)** and then click **Properties**.



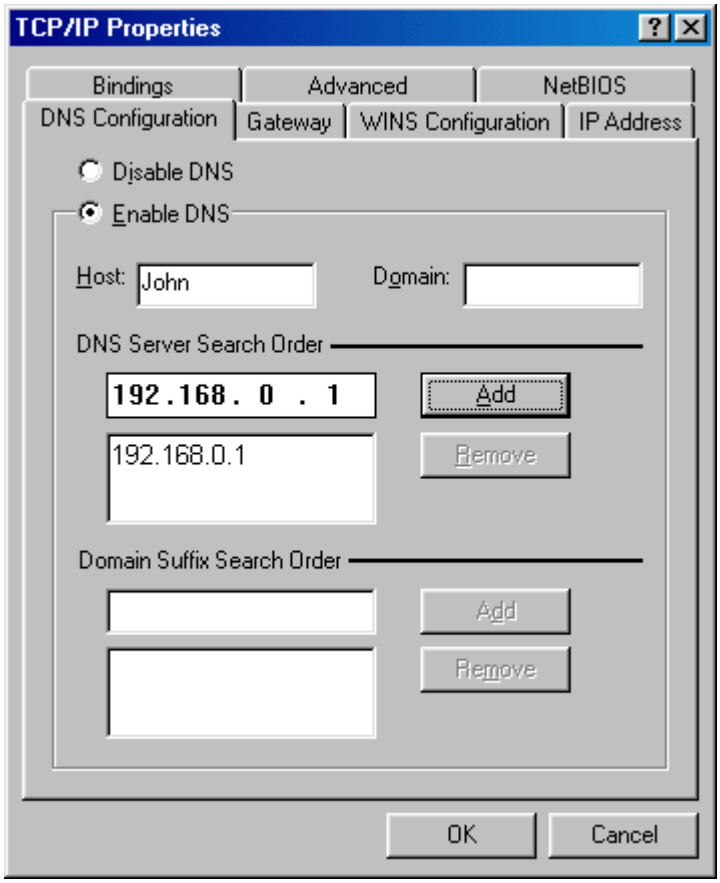
- Click **Specify an IP Address**.
- Enter in an IP Address that is on the same subnet as the LAN IP Address on your router. Example: If the router´s LAN IP Address is 192.168.0.1, make your IP Address 192.168.0.X where X is between 2-99. Make sure that the number you choose is not in use on the network.



- Click on the **Router** tab.
- Enter the LAN IP Address of your router here (192.168.0.1).
- Click **Add** when finished.



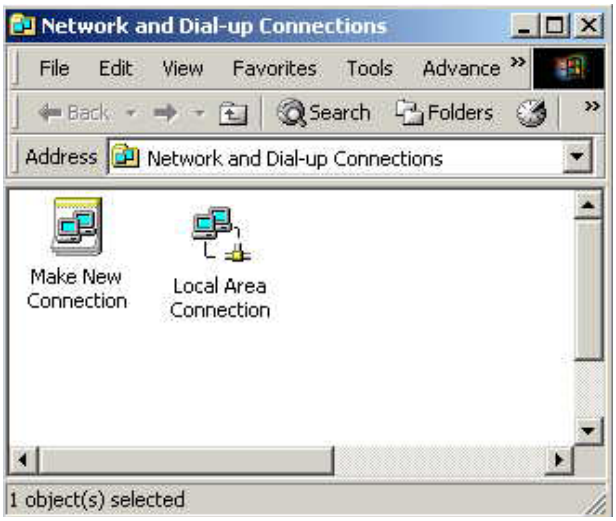
- Click on the **DNS Configuration** tab.
- Click **Enable DNS**. Type in a **Host** (can be any word). Under DNS server search order, enter the LAN IP Address of your router (192.168.0.1). Click **Add**.



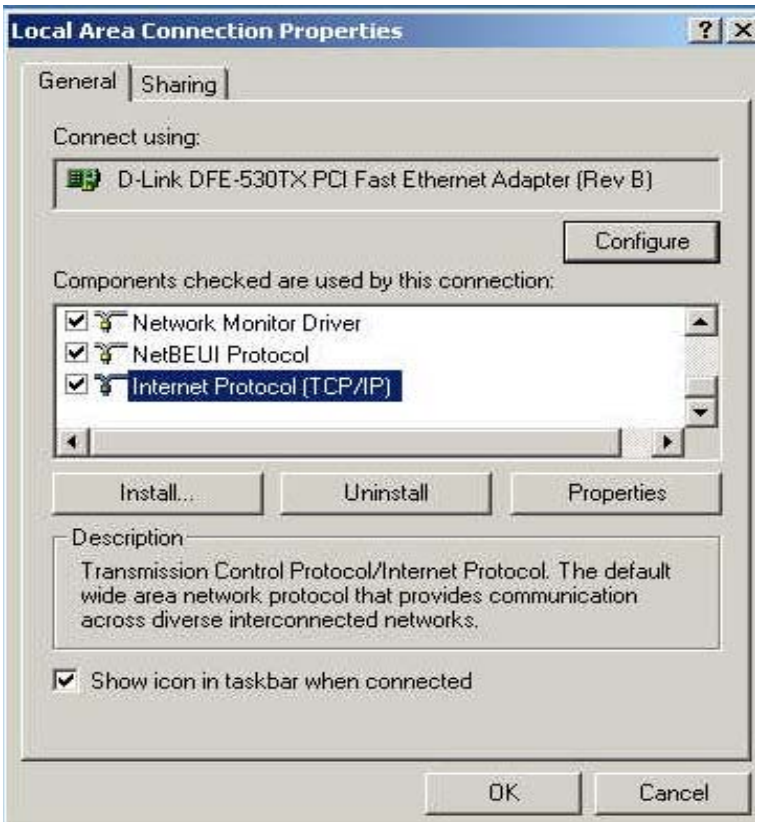
- Click **OK** twice.
- When prompted to reboot your computer, click **Yes**. After you reboot, the computer will now have a static, private IP Address.

4. How can I assign a Static IP Address in Windows 2000?

- Right-click on **My Network Places** and select **Properties**.
- Right-click on the **Local Area Connection** which represents your network card and select **Properties**.



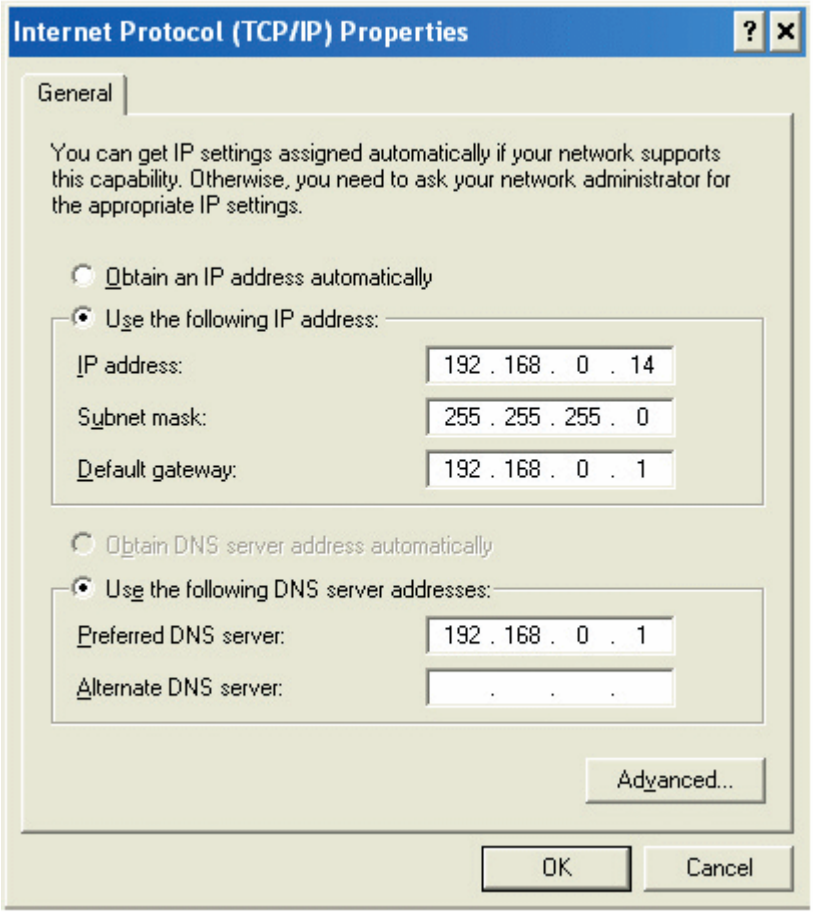
- Highlight **Internet Protocol (TCP/IP)** and click **Properties**.



- Click **Use the following IP Address** and enter an IP Address that is on the same subnet as the LAN IP Address on your router. Example: If the router´s LAN IP Address is 192.168.0.1, make your IP Address 192.168.0.X where X = 2-99. Make sure that the number you choose is not in use on the network.
- Set the **Default Router** to be the same as the LAN IP Address of your router (192.168.0.1).
- Set the **Primary DNS** to be the same as the LAN IP address of your router (192.168.0.1).
- **The Secondary DNS** is not needed or enter a DNS server from your ISP.
- Click **OK** twice. You may be asked if you want to reboot your computer. Click **Yes**.

5. How can I assign a Static IP Address in Windows XP?

- Click on **Start > Control Panel > Network and Internet Connections > Network connections**.
- See the steps for assigning a static IP address in Windows 2000 and continue from there.


Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 0 . 14
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 192 . 168 . 0 . 1
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server: 192 . 168 . 0 . 1
Alternate DNS server:
Advanced...
OK
Cancel

- Access the Web management. Open your Web browser and enter the IP Address of your router device in the address bar. This should open the login page for the Web management. Follow instructions to login and complete the configuration.

Appendix A Glossary

Address mask

A bit mask used to select bits from an Internet address for subnet addressing. The mask is 32 bits long and selects the network portion of the Internet address and one or more bits of the local portion. Sometimes called subnet mask.

AAL5

ATM Adaptation Layer - This layer maps higher layer user data into ATM cells, making the data suitable for transport through the ATM network.

ADSL

Asymmetric digital subscriber line.

ATM

Asynchronous Transfer Mode - A cell-based data transfer technique in which channel demand determines packet allocation.
ATM offers fast packet technology, real time; demand led switching for efficient use of network resources.

AWG

American Wire Gauge - The measurement of thickness of a wire.

Bridge

A device connects two or more physical networks and forwards packets between them. Bridges can usually be made to filter packets, that is, to forward only certain traffic. Related devices are: repeaters which simply forward electrical signals from one cable to the other, and full-fledged routers which make routing decisions based on several criteria.

Broadband

Characteristic of any network multiplexes independent network carriers onto a single cable. Broadband technology allows several networks to coexist on one single cable; traffic from one network does not interfere with traffic from another. Broadcast A packet delivery system where a copy of a given packet is given to all hosts attached to the network. Example: Ethernet.

CO

Central Office. Refers to equipment located at a Telco or service provider's office.

CPE

Customer Premises Equipment located in a user's premises.

DHCP (Dynamic Host Configuration Protocol)

DHCP is software that automatically assigns IP addresses to client stations logging onto a TCP/IP network. DHCP eliminates having to manually assign permanent IP addresses to every device on your network. DHCP software typically runs in servers and is also found in network devices such as Routers.

DMT

Discrete Multi-Tone frequency signal modulation

Downstream rate

The line rate for return messages or data transfers from the network machine to the user's premises machine.

DSLAM

Digital Subscriber Line Access Multiplex

Dynamic IP Addresses

A dynamic IP address is an IP address that is automatically assigned to a client station (computer, printer, etc.) in a TCP/IP network. Dynamic IP addresses are typically assigned by a DHCP server, which can be a computer on the network or another piece of hardware, such as the Router. A dynamic IP address may change every time your computer connects to the network.

Encapsulation

The technique used by layered protocols in which a layer adds header information to the protocol data unit (PDU) from the layer above. As an example, in Internet terminology, a packet would contain a header from the physical layer, followed by a header from the network layer (IP), followed by a header from the transport layer (TCP), followed by the application protocol data.

Ethernet

One of the most common local area network (LAN) wiring schemes, Ethernet has a transmission rate of 10 Mbps.

FTP

File Transfer Protocol. The Internet protocol (and program) used to transfer files between hosts.

Hop count

A measure of distance between two points on the Internet. It is equivalent to the number of routers that separate the source and destination.

HTML

Hypertext Markup Language - The page-coding language for the World Wide Web.

HTML browser

A browser used to traverse the Internet, such as Netscape or Microsoft Internet Explorer.

http

Hypertext Transfer Protocol - The protocol used to carry world-wide-web (www) traffic between a www browser computer and the www server being accessed.

ICMP

Internet Control Message Protocol - The protocol used to handle errors and control messages at the IP layer. ICMP is actually part of the IP protocol.

Internet address

An IP address is assigned in blocks of numbers to user organizations accessing the Internet. These addresses are established by the United States Department of Defense's Network Information Center. Duplicate addresses can cause major problems on the network, but the NIC trusts organizations to use individual addresses responsibly. Each address is a 32-bit address in the form of x.x.x.x where x is an eight- bit number from 0 to 255. There are three classes: A, B and C, depending on how many computers on the site are likely to be connected.

Internet Protocol (IP)

The network layer protocol for the Internet protocol suite

IP address

The 32-bit address assigned to hosts that want to participate in a TCP/IP Internet.

ISP

Internet service provider - A company allows home and corporate users to connect to the Internet.

MAC

Media Access Control Layer - A sub-layer of the Data Link Layer (Layer 2) of the ISO OSI Model responsible for media control.

MIB

Management Information Base - A collection of objects can be accessed via a network management protocol, such as SNMP and CMIP (Common Management Information Protocol).

NAT

Network Address Translation - A proposal for IP address reuse, where the local IP address is mapped to a globally unique address.

NVT

Network Virtual Terminal

PAP

Password Authentication Protocol

PORT

The abstraction used by Internet transport protocols to distinguish among multiple simultaneous connections to a single destination host.

POTS

Plain Old Telephone Service - This is the term used to describe basic telephone service.

PPP

Point-to-Point-Protocol - The successor to SLIP, PPP provides router-to-router and host-to-network connections over both synchronous and asynchronous circuits.

PPPoE

PPP over Ethernet is a protocol for connecting remote hosts to the Internet over an always-on connection by simulating a dial-up connection.

Remote server

A network computer allows a user to log on to the network from a distant location.

RFC

Request for Comments - Refers to documents published by the Internet Engineering Task Force (IETF) proposing standard protocols and procedures for the Internet. RFCs can be found at www.ietf.org..

Route

The path that network traffic takes from its source to its destination. The route a datagram may follow can include many routers and many physical networks. In the Internet, each datagram is routed separately.

Router

A system responsible for making decisions about which of several paths network (or Internet) traffic will follow. To do this, it uses a routing protocol to gain information about the network and algorithms to choose the best route based on several criteria known as "routing metrics".

Routing table

Information stored within a router that contains network path and status information. It is used to select the most appropriate route to forward information along.

Routing Information Protocol

Routers periodically exchange information with one another so that they can determine minimum distance paths between sources and destinations.

SNMP

Simple Network Management Protocol - The network management protocol of choice for TCP/IP-based Internet.

SOCKET

(1) The Berkeley UNIX mechanism for creating a virtual connection between processes.
(2) IBM term for software interfaces that allow two UNIX application programs to talk via TCP/IP protocols.

Spanning-Tree Bridge Protocol (STP)

Spanning-Tree Bridge Protocol (STP) - Part of an IEEE standard. A mechanism for detecting and preventing loops from occurring in a multi-bridged environment. When three or more LAN's segments are connected via bridges, a loop can occur. Because a bridge forwards all packets that are not recognized as being local, some packets can circulate for long periods of time, eventually degrading system performance. This algorithm ensures only one path connects any pair of stations, selecting one bridge as the 'root' bridge, with the highest priority one as identifier, from which all paths should radiate.

Spoofing

A method of fooling network end stations into believing that keep alive signals have come from and returned to the host. Polls are received and returned locally at either end

Static IP Addresses

A static IP address is an IP address permanently assigned to computer in a TCP/IP network. Static IP addresses are usually assigned to networked devices that are consistently accessed by multiple users, such as Server PCs, or printers. If you are using your Router to share your cable or DSL Internet connection, contact your ISP to see if they have assigned your home a static IP address. You will need that address during your Router's configuration.

Subnet

For routing purposes, IP networks can be divided into logical subnets by using a subnet mask. Values below those of the mask are valid addresses on the subnet.

TCP

Transmission Control Protocol - The major transport protocol in the Internet suite of protocols provides reliable, connection-oriented full-duplex streams.

TFTP

Trivial File Transfer Protocol - A simple file transfer protocol (a simplified version of FTP) that is often used to boot diskless workstations and other network devices such as routers over a network (typically a LAN).

Telnet

The virtual terminal protocol in the Internet suite of protocols - Allows users of one host to log into a remote host and act as normal terminal users of that host.

Transparent bridging

So named because the intelligence necessary to make relaying decisions exists in the bridge itself and is thus transparent to the communicating workstations. It involves frame forwarding, learning workstation addresses and ensuring no topology loops exist (in conjunction with the Spanning-Tree algorithm).

UDP

User Datagram Protocol - A connectionless transport protocol that runs on top of TCP/IP's IP. UDP, like TCP, uses IP for delivery; however, unlike TCP, UDP provides for exchange of datagrams without acknowledgments or guaranteed delivery. Best suited for small, independent requests, such as requesting a MIB value from an SNMP agent, in which first setting up a connection would take more time than sending the data.

UNI signaling

User Network Interface signaling for ATM communications.

Virtual Connection (VC)

A link that seems and behaves like a dedicated point-to-point line or a system that delivers packets in sequence, as happens on an actual point-to-point network. In reality, the data is delivered across a network via the most appropriate route. The sending and receiving devices do not have to be aware of the options and the route is chosen only when a message is sent. There is no pre-arrangement, so each virtual connection exists only for the duration of that one transmission.

WAN

Wide area network - A data communications network that spans any distance and is usually provided by a public carrier (such as a telephone company or service provider).

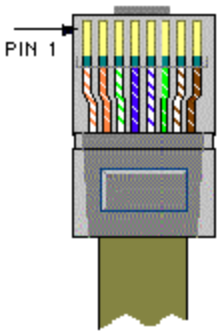
Appendix B Cabling / Connection

Network cables connect PCs in an Ethernet network Category 5, called "Cat5" for short is commonly used type of network cable today.

Cat 5 cables are tipped with RJ-45 connectors, which fit into RJ-45 port.

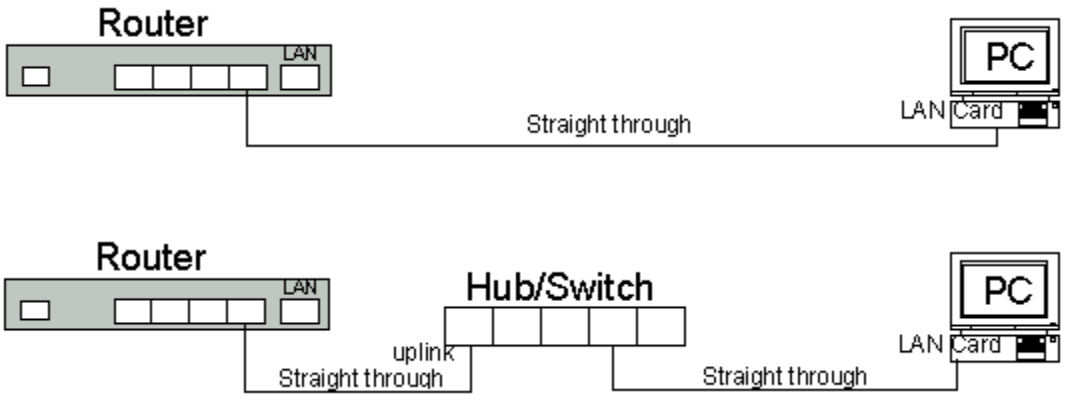
Straight-through vs. Crossover Cables:

Straight-through	
Wire	**Becomes**
1	1
2	2
3	3
6	6



Straight-through	
Wire	**Becomes**
1	1
2	2
3	3
6	6

LAN Connection:



To check LEDs light up when you finish connecting two pieces of hardware.